BRASS WORLD
AND
PLATING — POLISHING — FINISHING

A Monthly Publication Relating to the Arts of Refining, Alloying, Casting, Rolling, Plating, Polishing and Finishing of the Non-Ferrous Metals and Their Alloys

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Electroplaters' Annual Convention in Detroit

A Report of the 17th Annual Convention of the American Electroplaters' Society, Held in Detroit, Mich., July 8-11, 1929

ALL of the regular officers of the American Electroplaters' Society were re-elected for the coming year at the Annual Convention of the Society, held at the Statler Hotel, Detroit, July 8-11. These officers are as follows:

Horace H. Smith, Newark Branch, president.

C. A. Van Derau, Dayton Branch, 1st vice-president.

William J. R. Kennedy, Hartford-Connecticut Valley Branch, 2nd vice-president.

George Gehling, Philadelphia Branch, secretary-treasurer.

F. J. Hanlon, Chicago Branch, editor The Monthly Review.

With **John H. Feeley,** Montreal Branch, past president, the above officers will constitute the new executive board.

1930 Convention in Washington, D. C.

Washington, D. C., was chosen as the location of the convention city for 1930. The convention will be in charge of the Baltimore-Washington Branch.

Electroplaters and Guests at the Convention, Assembled at Bob-Lo

(Photo continued on next two pages)

Prizes

For papers and exhibits, prizes were awarded as follows:

Papers: 1st prize, **F. C. Mesle,** New York Branch.
2nd prize, **Newark Branch** (under the supervision of **Oliver J. Sizelove,** instructor) for its experimental work during the year.
3rd prize, **Harold K. Work,** Pittsburgh, Pa.
Honorable mention, **Jacob Paine** and **B. F. Lewis,** Detroit Branch.

Exhibits: 1st prize, **F. Weber,** St. Louis Branch.
2nd prize, **George Ramm,** Detroit Branch.
3rd prize, **J. F. Bernardo,** Philadelphia Branch.
Honorable mention, **E. Hail,** Detroit Branch.

Opening Ceremonies

The opening session was started at 1:30 P. M., July 8th, with an address of welcome by E. G. Lovering of Detroit, chairman of the Convention Committee. T. C. Eichstaedt was introduced to the assembly, as were also George A. Walters, alderman of Detroit, who acted as representative of Mayor Lodge. The meeting was then turned over to President Smith, who introduced Charles H. Proctor, founder of the Society. Mr. Proctor delivered an address on "Looking Forward in the Electroplating Industry."

Re-Elected Officers of the American Electroplaters' Society

HORACE H. SMITH
Newark Branch
President

C. A. VAN DERAU
Dayton Branch
First Vice-President

W. J. R. KENNEDY
Hartford, Conn., Valley Branch
Second Vice-President

Technical Sessions

The Monday evening session was opened with a paper on "Scientific Plating Control" by L. C. Turnock of the Turnock Engineering Company, Cleveland, Ohio. A. L. Matthes of the Westinghouse Electric and Manufacturing Company, discussed "wage incentives."

There Were About 700 People on the Trip—A Ball Game, West vs. East.

J. M. Carmody spoke on "Executive Foremanship."

Dr. A. K. Graham read a paper on "Industrial Cleaning of Metals" which was highly commended.

The Tuesday morning session was opened by George B. Hogaboom with an excellent paper on "Brass Plating." Other papers read at this session were as follows:

Electrodeposition of Iron by T. P. Thomas.

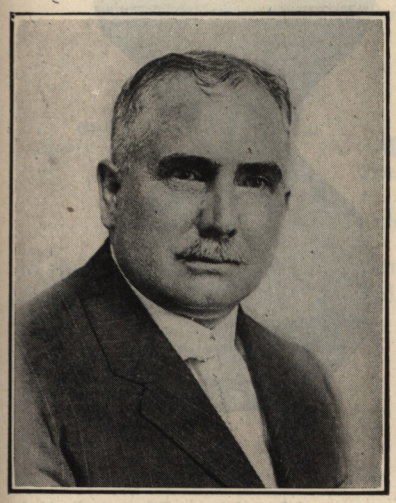
Some Causes of Resistance in Chromium Plating Solutions by Professor D. T. Ewing.

Mechanics of Chromium Plating by Walter W. Rowe.

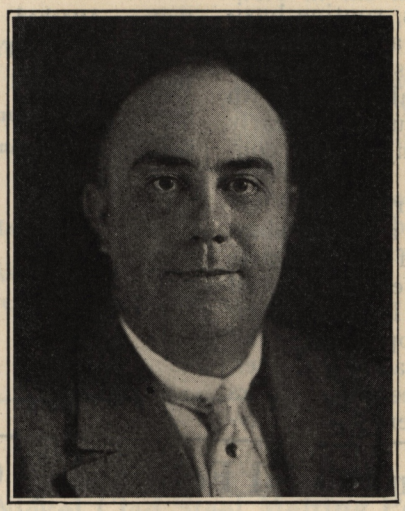
Some Observations on the Corrosion of Chromium Deposits by Cleveland Nixon.

Conditions that Cause Changes in the Composition of Plating Baths and Possible Remedies, by Professor F. C. Mathers.

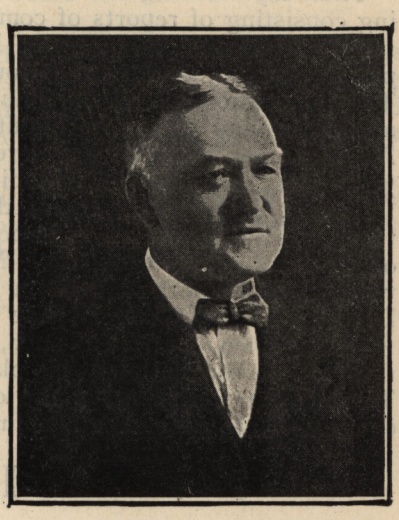
Re-Elected Officers of the American Electroplaters' Society



GEORGE GEHLING
Philadelphia Branch
Secretary-Treasurer



F. J. HANLON
Chicago Branch
Editor, The Monthly Review



J. H. FEELEY
Montreal Branch
Past President

Electroplating of Cadmium from Cyanide Baths by L. R. Westbrook.

Cadmium Plating by H. C. Pierce.

Report of the Possibilities of Poisoning from Cadmium Plating by George P. Dubpernell.

At the Tuesday afternoon session the following papers were read:

Chromium Plating Factors by Oliver J. Sizelove.

The Tuesday evening session consisted of a summary of the researches on electroplating carried on by the Bureau of Standards, Washington, D. C. This was published in some detail in the BRASS WORLD for April, 1929, pages 79-80.

Reports from the Research Committee were made by R. J. O'Connor of the Bridgeport Branch and Philip Sievering of the New York Branch.

Enlivened the Day. Bob-Lo Is in Canada, Not Far from Detroit.

At the final session on Wednesday morning, the following papers were read and discussed.

Material Costs of Various Finishes by C. A. Van Dereau.

The Measurement of Chlorides in Nickel Plating Solutions by Donald Wood.

A Warning by W. M. Phillips.

Electrodeposition of Non-Metallic Materials by Milford H. Corbin.

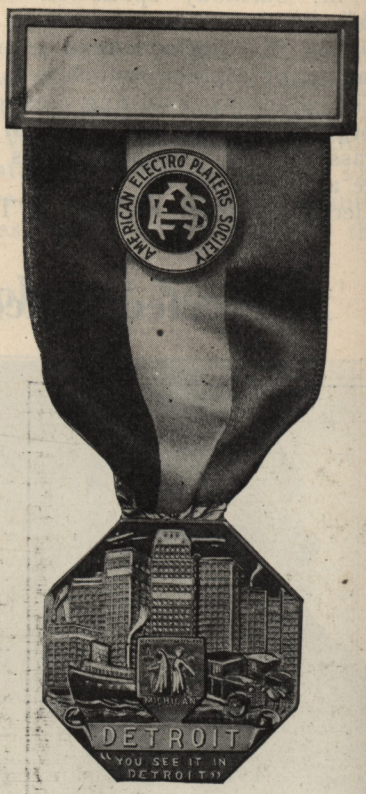
Entertainment Features

Wednesday afternoon was given up to a trip down the Detroit River to Bois Blanc Island where a ball game was held followed by dancing and refreshments.

Thursday morning was devoted to a business meeting consisting of reports of committees, routine business and election of officers. In the afternoon, the platers visited plants in various parts of the city. The convention closed on Thursday afternoon with a banquet and dance for about 650 guests. Nearly 700 delegates and visitors were present at the convention, 125 of these being ladies.

One of the bright spots of the entertainment features was the visit to the airport and airplane plant of the Ford Motor Company. Many of the delegates were taken into the air for a trip over the city of Detroit and the Canadian side of the Detroit River.

E. V. Allen, Detroit Branch, kept open house all through the convention at his plant, Evaco Industries. The Detroit Branch gave the delegates and visitors every possible assistance and full cooperation in having one of the most enjoyable and worth-while of conventions.



The Platers at the Convention Wore This Badge and the Button Attached to the Ribbon, a Fine Insignia Designed by the Detroit Branch Convention Committee.

International Fellowship Club

The International Fellowship Club held its annual luncheon and business meeting at the Statler Hotel in Detroit on July 9th. This meeting was one of the best ever held in the history of the Society, being attended by 56 manufacturers and sales representatives.

New officers were elected for the year 1929-1930 as follows:

Chairman, Benjamin Popper, Egyptian Lacquer Manufacturing Company, New York.

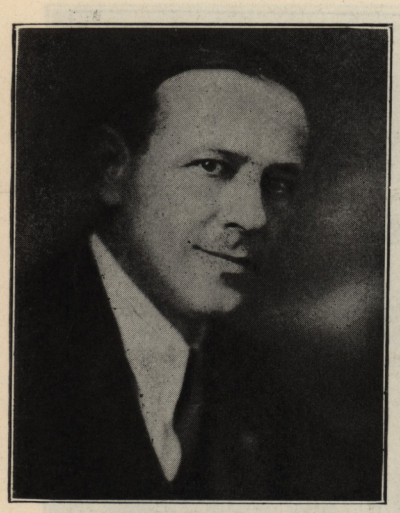
Vice-Chairman, G. Cannon, Matchless Metal Polish Company, Chicago, Ill.

Secretary, T. A. Trumbour, business manager, THE METAL INDUSTRY and the BRASS WORLD, New York.

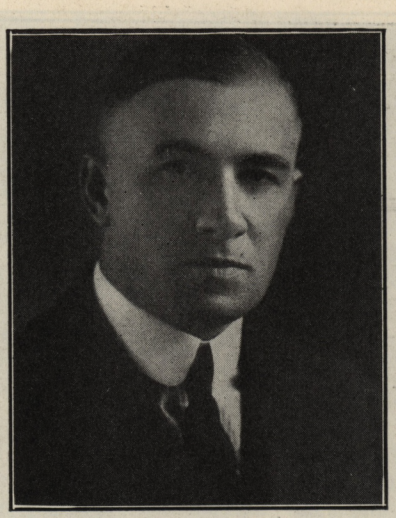
The new officers were installed by W. S. McKeon, Greensburg, Pa. The outgoing officers were congratulated on their work in attracting so much interest in the Club.

The next meeting will be held in Chicago. The date and place will be announced in the near future in this journal.

New Officers of the International Fellowship Club



BENJAMIN POPPER
Egyptian Lacquer Manufacturing Company, New York
Chairman



G. CAMERON
Matchless Metal Polish Company, Chicago, Ill.
Vice-Chairman

T. A. TRUMBOUR
The Metal Industry and the Brass World, New York
Secretary

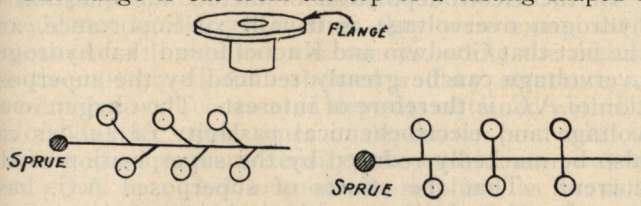
Pitted Brass Casting Due to Improper Moulding

Q.—We are encosing a brass flange, the surface of which has been turned and scratchbrushed. You will note the entire surface is pitted. Our foundry foreman is at a loss to understand how this pitting occurs and we are sending it to you for your advice.

The metal used is composed of the following:

Copper	82
Lead	4
Tin	4
Zinc	10

The flange is cut from the top of a casting shaped as



Flange Casting and Method of Moulding

in the central figure in the illustration. We have moulded these castings both ways up, and we have gated them two different ways, the gating diagrams herewith showing the two procedures.

However, each time the pitting occurs, despite our efforts to check it.

If you can give us any advice or information in this matter we shall be very glad to have it.

A.—On examination of the sample, the metal appears to be spongy on one side. On the other side the metal is clear of such defects. This leads us to believe your trouble is in the moulding sand, because if the trouble were in the metal it would show some signs on both sides.

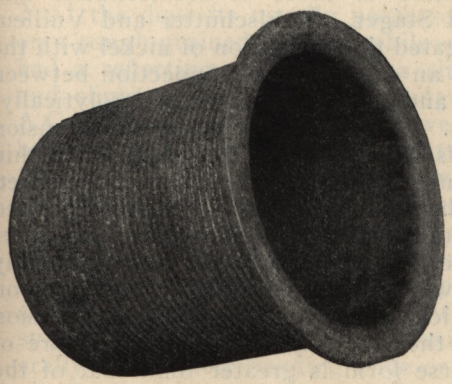
This defect must, therefore, be on the cope side as marked, and we suggest that you open up your molding sand, using sand similar to No. 2 Albany; vent your mold and do not ram the cope side as hard as you are now doing.

Add a spoonful of common table salt to the metal and stir well before pouring. We feel that your trouble, due to this cause, will be eliminated.

—W. J. Reardon.

Nickel Clad Steel Melting Pots

The International Nickel Company, New York, has developed and placed on the market a new type of melting pot which is made of steel and coated with nickel by welding. The pot is described in the company's magazine, "Inco," Volume 9, Number 1, in an article by G. R. Greenslade entitled "Nickel Clad Steel Eliminates Costly Pot Failures." He states that the pot is made of low carbon steel or ingot iron, drawn from the solid sheet, and is covered with nickel by metallic arc welding. The steel on the inside of the pot is capable of resisting the lead or other constituents of the bath while the nickel on the outside resists the action of air and combustion gases at high temperature. Due to the strength and ductibility of the metals used, a relatively thin wall is sufficient, as there is no danger of failure by cracking. It is, therefore, necessary to use Niclad pots, having a thickness of only ½ inch. This results in better heat conductivity and almost negligible drop in temperature. The two metals are said to be very well suited for joining, since their coefficients of thermal expansion are about the same and there is no tendency to force the two metals apart when they are heated up to high temperatures.



An inner surface of steel resists corrosive action in the pot and a non-oxidizing outer coat of nickel affords protection against hot furnace gases

Tests are cited, which show an average length of 7,000 hours for Niclad, compared with 300 hours for plain steel and 1,000 hours for special heat resisting alloys.

Flooring for Factories

A new type of flooring called Kabalt is being made by Dyer, Inc., 796 Tenth avenue, New York, with factory at Rutherford, N. J. This is a mastic floor consisting of an asphalt base strengthened by a cement ingredient. It can be furnished in special compositions to resist acids or alkalies. Patches of this material can be laid on a Saturday and be ready for use on the following Monday. It is claimed to be resistant to hard knocks, and when dented, to come back to its original smoothness.

Flux for Various Alloys

The Aelium Company, 832 No. Spring street, Los Angeles, Calif., has placed on the market a material said to be a natural cleanser of metals. It is recommended by them for high lead bronzes, to keep the lead suspended, and for other standard brasses and bronzes, to result in more homogeneous mixes, better machining qualities, better polishing qualities and closer grained metal; also for manganese bronze to cut down the shrinkage and eliminate porosity.

This material is recommended also for a number of other alloys in mixtures depending upon the composition used.

Is Superposed Alternating Current Worth While in the Plating Room?

Report of An Interesting Paper Bearing on This Question Held in London, Eng.

By OUR LONDON CORRESPONDENT

WRITTEN ESPECIALLY FOR BRASS WORLD

A SUBJECT of unusual interest to those engaged in electrodeposition was treated by Dr. H. C. Cocks in a paper read before the Electroplaters' and Depositors' Technical Society, the title of the paper being "Some Possible Uses of Alternating Currents in Electrodeposition." An interesting discussion followed the reading of the paper.

Dr. Cocks' Remarks

After dealing with electrolysis using A.C. alone, Dr. Cocks dealt with the electrolysis with superposed A.C. He said the best method of superposing A.C. on D.C. was that used by Cooper Jones and others. The A.C. is passed through the primary of a transformer, and the D.C. source and electrolysis cell are connected in series with the secondary coil. An A.C. is induced in the secondary coil, and is thus superposed on the D.C. flowing in it. A battery of accumulators is a convenient source of D.C.: they do not appear to be appreciably affected by the passage of the A.C. through them. Other methods, such as those in which auxiliary A.C. electrodes are used, have the disadvantage that there is usually some leakage of A.C. into the D.C. circuit and vice versa. The D.C. component of the superposed current can be measured by a moving-cell ammeter, while the A.C. component can be calculated from the reading of a hot-wire ammeter placed in the same circuit. The reading of the hot-wire ammeter is the square root of the sum of the squares of the A.C. and D.C. components of the current.

The action of superposed A.C. in a process may be looked at from two points of view. One way of considering it is to first imagine the electrolysis taking place by A.C. alone, and then to visualize the changes which should occur when one pulse of the current is made of greater amplitude than the other. The other way of considering the action is to look upon it as a D.C. electrolysis being modified by the superposed A.C. In considering it from the second point of view, it must be remembered that, providing the ratio of the A.C. to the D.C. is greater than 0.707:1, an electrode which is cathode in the D.C. process will periodically tend to become anode and vice versa.

The important conclusion to be drawn from work which has been done on the subject is that the superposition of an A.C. on a D.C. electrode process tends to reduce any irreversibility in that process ("The Principles of Applied Electrochemistry," Allmand and Ellingham, p. 147). The superposed A.C. acts as a depolarizer: it reduces anode and cathode polarization and electrochemical passivity. It is therefore most likely to be of use in the electrodeposition of metals in cases where a reduction of polarization is required. These statements are probably only true when the A.C. component of the current is greater than 0.707 of the value of the D.C. component. Chemical depolarizers may leave undesirable decomposition products in the electrolyte, but superposed A.C. will not do so.

In the electrodeposition of metals the question of hydrogen overvoltage is usually of importance, and the fact that Goodwin and Knobel found that hydrogen overvoltage can be greatly reduced by the superposition of A.C. is therefore of interest. The oxygen overvoltage and electrochemical passivity of anodes can also be markedly reduced by the superposition of the current. That the effects of superposed A.C. have been found to increase with the ratio of the A.C. to the D.C. and to decrease with increase of frequency has already been mentioned. In certain cases, however, an A.C. of very high frequency may possibly have a greater effect than one of low frequency.

It should be pointed out that the superposition of A.C. in processes involving the electrodeposition of metals may affect (probably adversely) the throwing power in these processes.

The work which has been done on the effects of superposed A.C. in processes involving metal deposition will now be mentioned. One of the most promising of the possible applications of superposed A.C. is its use in nickel deposition. Kohlschütter and Schödl have published two papers on the effect of superposed A.C. in nickel deposition. The first deals with the effect of the superposed current on the structure, contractibility and bendability of nickel deposits, and the second with its influence on the deposition and solution of potentials of nickel. Their investigations were a continuation of those of Kohlschütter and Vuilleumier, and Stäger. Kohlschütter and Vuilleumier had investigated the deposition of nickel with the object of finding an experimental connection between the polarization and the structure of electrolytically-deposited metals. They studied the internal tension of nickel deposits by depositing the metal on a thin platinum sheet and following the bending of the sheet, and concluded that nickel is probably first deposited in a highly disperse form, and then the particles sinter with the formation of a denser metal. This probably occurs together with the formation of a gas layer on the cathode which plays the part of a dispersion medium. Since the electrolytic solution pressure of the highly disperse form is greater than that of the denser metal, this view gives an explanation of the increase in the deposition potential above that of the normal metal. Stäger had found that chemical depolarizers, such as hydrogen perozide and nitrobenzene, increase of temperature and the superposition of A.C. effected a distinct structural alteration in nickel deposits and strongly reduced the tendency to contraction.

Influence of Nickel Deposition

The influence of superposed A.C. was particularly marked and permitted of the deposition of smooth, contracted nickel at the cathode. The effect of A.C. was regarded as a reduction of the hydrogen charge

of the cathode, i.e., a depolarization. Kohlschütter and Schödl investigated the deposition of nickel from solutions consisting mainly of nickel chloride, nickel ammonium chloride, nickel sulphate, or nickel ammonium sulphate, using D.C. alone and a superposed A.C. of 40 cycles. By depositing the nickel on the platinum of a contractometer they measured on an arbitrary scale, the contraction of the deposits obtained under various conditions. The superposition of A.C. was found to greatly reduce the contraction of the nickel, the effect, under otherwise constant conditions, increasing with increase of the ratio of A.C.: D.C. Great differences were observed between the structure of the deposits obtained with D.C. and with superposed A.C. The structure of the D.C. deposits could not be discerned when they were examined by means of a low-power microscope, while the deposits with superposed A.C. showed a flaky structure and resembled well contracted deposits obtained with D.C. alone. After equal times of deposition, and with use of the same current density, the contraction was not so great in nickel ammonium sulphate as in nickel ammonium chloride solutions. With D.C. alone, hydrogen evolution occurred mainly only during the first few minutes of, but with superposed A.C. it continued throughout, the time of deposition and increased with increase of current density. They also studied the deposition of nickel on copper. When the nickel was deposited on copper from a solution of nickel ammonium chloride, the current efficiency was 92 to 98 per cent with D.C. alone, but with superposed A.C. it was slightly lower and decreased with increase of the ratio A.C. : D.C. With A.C. : D.C. = 10 : 1 it was 80 to 94 per cent. In sulphate solutions the current efficiency for nickel using superposed A.C. was appreciably lower than with D.C. alone: it fell to as low as 25 per cent with a large A.C. is to D.C. ratio. The deposits on copper obtained by use of superposed A.C. were also clearly distinguishable from those obtained with D.C. alone. The deposits with D.C. had a fine-grained structure, but when superposed A.C. was used, the grains gradually became coarser with increase of the ratio A.C. : D. C. With A.C. : D.C. = 2 : 1 the deposits usually possessed a velvety glance on a rough-grained surface, while with D.C. only they had a reflecting surface with a slight brownish tint, and slight outgrowths at the edges. With a lower A.C. : D.C. ratio, the deposits were often reflecting, but with higher ratios, rough, matt surfaces were obtained. The deposits on copper were easily differentiated on bending; those obtained with D.C. from chloride solutions broke with every little bending, while those obtained with superposed A.C. broke only on repeated bending. The D.C. deposits from sulphate solutions were somewhat less brittle than the corresponding ones from chloride solutions, yet they generally broke after bending once or twice, while those obtained with superposed A.C. were very bendable. The inside of thick layers of nickel (unlike the surface) showed no great difference of structure according to whether they were deposited with D.C. or superposed A.C. Kohlschütter and Schödl also measured the deposition and solution potentials of nickel with D.C. alone and with superposed A.C. This part of the work was carried out to see if a direct relationship could be established between the deposition potential and the structure and tendency to contraction of the deposits. They found that the deposition potential was decreased by the superposition of A.C., i.e., a depolarization occurred, and that the effect became greater the larger the ratio A.C. : D.C. With a large ratio, the deposition potential was lowered by about 0.25 volt. The anode polarization was found to be decreased in a similar but more pronounced way, the decrease amounting to about 0.5 volt in certain cases. The voltage across the cell was reduced by an amount which was approximately the sum of the decreases of polarization at cathode and anode. They concluded that the relationship between the tendency of the deposits to contraction, their structure and the deposition potential is not so close as might at first appear, although there is a general parallelism between the lowering of the deposition potential and the decrease in the tendency to contraction which results from the superposition of A.C.

This work on the reduction of the internal stress of nickel deposits by the superposition of A.C. is being continued and extended by R. H. D. Barklie in the course of investigations carried out under the supervision of Prof. Sesch for the Department of Scientific and Industrial Research at Sheffield University.

Tuckel and Loesch carried out some work on the use of superposed A.C. in nickel deposition. They measured anode and cathode current efficiencies using D.C. alone and superposed A.C. but gave no details of the appearance or structure of the cathode deposits. They state that nickel deposits obtained from nickel ammonium sulphate solutions are harder and more durable than those produced in chloride solutions, and that the use of nickel ammonium sulphate solutions necessitates the use of impure anodes because anodes of pure nickel do not corrode well and tend to become passive. They point out the objections to the use of impure nickel anodes and showed by their experiments that pure anodes could be made to corrode well in nickel ammonium sulphate solutions by the superposition of A.C. on the D.C. For example, by the superposition of an A.C. of a sufficiently large value, the D.C. efficiency for the solution of nearly pure rolled nickel anodes was raised from below 5 per cent to above 80 per cent, of sandblasted electrolytic nickel anodes from 27 per cent to over 100 per cent, and of smooth electrolytic nickel anodes from 50 per cent to over 100 per cent. The D.C. density was from 8 to 14 amperes per sq. ft.

Gold Refining

The only case of the technical use of superposed A.C. in electrolysis is that of the Wohwill modified gold-refining process. (B. P. 6276, 1909.) In the ordinary Wohwill process crude gold anodes containing silver and small quantities of other metals are refined by means of D.C. in a bath containing gold chloride and hydrochloric acid. At low current densities the gold dissolves, and a layer of silver chloride forms on the anode. This coating has to be removed mechanically from time to time, otherwise the current density at the free gold surface is increased and chlorine is evolved instead of gold being dissolved. The higher the silver content of the alloy the more frequently must the anodes be scraped clean or the lower must be the current density used. It is important that the alloy should be refined as quickly as possible owing to the highest charges on the precious metal, hence the use of a low current density is a great advantage in the process. In the modified process, which is used for alloys containing more than 6 per cent of silver, this and other disadvantages are largely overcome. When a sufficiently large A.C. is superposed on the D.C., the D.C. density can be considerably increased, the silver chloride does not form an adherent coating on the anodes, and thus there is no need to scrape them. The bath voltage is reduced and the

percentage of the gold in the "slimes" is considerably decreased. With superposed A.C. the cathodically deposited gold can be obtained in a coherent form when high D.C. densities and cold solutions are used, while with D.C. alone this is not the case. The modified process is or has been used in U. S. mints. The saving in interest charges more than compensates for the cost of the A.C.

Discussion

D. MacDonald gave an interesting account of the use of superposed A.C. in the modified process for refining gold, the particular plant described consisting of sixty cells driven by the two motor generator sets and two motor alternator sets, each of about 45 h.p. The dynamo and alternator were arranged in series, and the capacity of the plant was about one ton per two days. By superposing an A.C. whose R.M.S. value was 10 per cent greater upon the D.C., an assymetrically alternating current was formed which produced a powerful anodic wave followed by a weak cathodic wave. The current density used was on the average 8.5 amps per sq. ft., and the frequency of alterations at least 50. The effect of the A.C. upon the solution of the anode was immediate. Instead of the current dropping to half its original value in a couple of hours due to the coating of silver chloride which formed, as occurred when no A.C. was used, and in fact eventually ceasing altogether, when A.C. was employed, the current was maintained until disintegration of the anode occurred 24 hours later. The silver chloride then formed a loose coating which dropped away and did not interfere with the passage of the current.

D. J. MacNaughton said that the scope for using superposed A.C. in electrodeposition was not very great at present. For example, in nickel plating, the passivity of the anodes which could be overcome by A.C. could be definitely overcome in a much simpler way by the use of chlorides in the solution. Similarly, stress in the nickel deposit which could also be reduced by employing A.C. might easily be reduced by raising the temperature of the solution. Nevertheless, it is possible that the A.C. might prove to be of increasing value to the plater if more precise knowledge were forthcoming on the effect of A.C. on other factors in deposition.

J. W. Perring said that a large number of advantages which were claimed for the commutator rectifier were offset by quite a number of serious disadvantages.

E. A. Ollard said it was quite possible that there might be a useful field for A.C. in the future and when the time arrived it would no doubt be found possible to design apparatus of the right kind to give the type of pulsating current required. It was important that investigators into the effect of A.C. should make a practice of describing the deposits which they obtained, as often they were treated as of secondary importance. It would be useful to try an interrupted D.C. and also a D.C. missed at intervals by means of a commutator as this would give larger periods in one direction than in the other.

G. E. Gardam said that the results obtained in the deposition of a nickel-zinc alloy could be obtained on the basis of rapidly varying current density. He wondered if it would in a similar way be possible to obtain an alloy of zinc and copper from a solution of their mixed sulphates by superimposing A.C. on D.C., thus realizing the "acid brass" bath.

The author then replied to the discussion and was accorded a hearty vote of thanks for the presentation of his paper.

Bright Brass Deposit

We have a certain outlet for an article made from heavy wire about .345" thick, in straight pieces of 2, 4, 6 and 10 ft. lengths. This, of course, is still brass plated in a steel tank. Our method has been to tumble these pieces first in a long wooden tumbler using sawdust. Following this, the pieces are rinsed and then brass plated, the short pieces up to 3 ft. long being brass plated in a mechanically revolving plating barrel; the long 10 and 12 ft. pieces racked and plated in a steel tank.

After plating, we rinse them in hot water, dry in hard maple sawdust, and then tumble in leather chips to get back a polish.

Now, for our purpose it is not necessary to have a very high polish on this, and we are wondering if there is not some brightener or other method we could use to do away with this last operation of tumbling in the leather chips? We are not particular about the finish being very bright, although of course we cannot use it as it is without tumbling or polishing in some way.

A.—The usual method of brightening a brass solution is to use arsenic. Prepare the brightener as follows: Take 4 ozs. of white arsenic (As_2O_3) and place it in a large evaporating dish. Take 1 pound of stick sodium hydroxide and place it also in the dish. Then pour water carefully over this. When the boiling has ceased due to solution of caustic soda, place over a small gas burner and heat slowly until arsenic is all dissolved. Allow to cook, transfer to a large bottle and make up to one gallon. This is added to your brass solution portions one to two fluid ounces, depending upon the volume of your solution. Bear these points in mind:

1. Do not think that because 1 oz. gave you a bright deposit larger amounts will make it brighter. The contrary is the fact, in addition to brass deposit becoming pale and white.

2. Curtail the use of both ammonia and zinc when using arsenic if you expect to maintain a nice yellow brass. If your solution runs low in zinc, due to undissolved zinc compounds from anodes settling in the bottom of the tank, remove clear solution, clean out sediment, and clear solution by adding 3 or 4 ozs. of Rochelle salts. From then on you should have no more trouble.

—Joseph Haas.

Appreciates Brass World Service

To the Editor of Brass World:

We appreciate indeed the personal attention you have given our inquiry regarding cadmium plate. It is a pleasure to know of someone who can and will give the expert advice you have.

Veeder-Root Incorporated

June 25, 1929 H. L. Spaunburg

Factory Manager, Bristol Division.

White Alloy for Hardware

To the Editor of BRASS WORLD:

There are several statements in Mr. Reardon's reply to my letter of March 15th as published in the April issue of BRASS WORLD under the title "White Alloy for Hardware," which we do not think are merited by the facts. It is possible that you have information aside from that given in the original question which would indicate that die castings are not suited to the customer's requirements; but the letter as printed last November described an article for which die castings would be perfectly satisfactory. It is for the information, therefore, of the general casting user that we are requesting the privilege of replying to Mr. Reardon, for we feel that his two replies do not give a true picture of modern zinc base die castings.

1. Mr. Reardon says that a zinc base alloy cast in sand does not compare in physical properties with the same alloy die cast. He is correct.

2. He says that, either sand cast or die cast, it does not have the strength of nickel silver. He is correct. A tensile strength of 60,000 lb., with 40% elongation, however, is entirely unnecessary for "hardware such as pulls, entrance handles, door knockers, etc." The strength of good die castings would be more than sufficient for such parts, and it is a waste of resources to pay for qualities which are not needed. To insist on nickel silver for a door pull because of its strength is just as ridiculous as to insist on alloy steel for a door pull because of its still greater strength.

3. Zinc base alloys are subject to pitting and turning black when exposed to the weather. The answer to that is simple, do not expose them. Protect them with electroplate, enamel, lacquer, etc. Of course, a yellow brass part can be whitened by plating, but if the plate wears off, the yellow shows up. A die casting is white under the worn plate, and the same friction which wears off the plate will tend to keep it polished at that point. Where there is no friction, the plate will remain.

4. A zinc die casting will not stand hammering. One of the beauties of a die casting, however, is that a hammered finished can be secured without hammering. The die can be engraved as desired, and all castings will have that surface. Hammering, therefore, is unnecessary in a die casting.

5. Mr. Reardon refers to its unsuitability for large hinges. He is right there if the strain on the hinges is excessive. If they are ordinary door hinges, however, simply enlarged for ornament, die castings offer an ample factor of safety. The original question, however, did not mention hinges, and 4% elongation is more than enough for "hardware such as pulls, entrance handles, door knockers, etc.," which the original question did mention.

6. Mr. Reardon's knowledge of the present use of zinc base die cast hardware is not as limited as he would imply. He has used it himself in his automobile. If he lives in a modern apartment or has a new office the chances are that he has some of it applied there. The fact that such parts are bought by the thousands proves that reliable architects do use them, whether or not they know it. When purchased in quantities, they usually offer such savings in original cost that they should be used wherever they are suitable. They are certainly suitable for ornamental door knockers and pulls.

In conclusion, let us thank you for the privilege of presenting the die casting side, and assure you that it is done for the purpose of presenting a true picture of modern die castings to the readers of BRASS WORLD.

The Stewart Die Casting Corporation,
D. L. COLWELL, Metallurgist.

Chicago, Ill., May 7, 1929.

Gentlemen:

To the Editor of BRASS WORLD:

I have the letter of Mr. D. L. Colwell, metallurgist of the Stewart Die Casting Company, Chicago, Ill., in reference to my answer to his letter of March 15th, as published in the April issue of BRASS WORLD.

It appears Mr. Colwell believes zinc is satisfactory for hardware. I do not agree with him, at least in reference to the question I answered at the time. I had in mind hardware for the first class building trade, not automobile hardware. Everyone knows such hardware is used on automobiles. People, like Corbin, who have made building hardware since 1849, do not furnish zinc hardware; and, as I said (and have since made inquiry), no reliable architect specifies such metal for the kind of hardware referred to.

Detroit, Mich., June 11, 1929. W. J. REARDON.

Nickel on Iron and Steel

Q.—We do a great deal of nickel plating on small cast iron articles and some on small steel articles, all either wheel polished or ball burnished. We are sufficiently successful in plating cast iron but invariably when we plate the steel we have trouble.

We do not get a good deposit and soon after it is buffed or ball burnished it will lose its color, and, after a few days' atmospheric exposure, it starts to turn brown and then rust.

Will you advise us as to the difference necessary in handling before, during and after plating iron and steel.

A.—In our estimation your nickel bath is entirely too acid. Your bath should be only acid enough so that steel will plate in it and then cast iron will also plate satisfactorily. In your case, the bath is so acid that only cast iron will plate and steel will not.

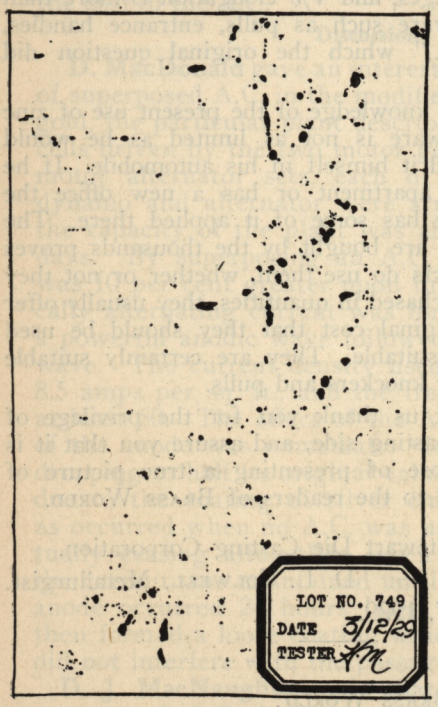
To correct this condition, we would advise you to add liquid ammonia, 1 quart at a time, until samples of steel articles can be plated satisfactorily.

As a measure in avoiding future difficulty, we would advise you to discontinue the practice of adding sulphuric or hydrochloric acid to your nickel tanks in large amounts. Make a careful study of the acidity of your nickel tank and you will find that you will seldom be required to add more than 4 fluid ounces of sulphuric acid or 8 to 1 ounces of hydrochloric acid, in 1 or 2 weeks. A better practice is never to add these acids unless you chemically control your solutions. Boric acid is the only safe acid to use in nickel solutions for those that have only experience to guide them.

—JOSEPH HAAS.

Simple Detector for Pinholes in Metal

The Fisher Scientific Company, Pittsburgh, Pa., has placed on the market a test paper known as Ferracco, by means of which, it is stated, pinholes in protective coatings may easily be detected without injury to the coated object or the coating. The tests, moreover, can be made rapidly, according to the Fisher company.



Ferracco Record of Pinholes in Tinplate

Ferracco test paper comes in sheets 22 in. x 17 in., coated with a mixture of potassium ferrocyanide, sodium chloride and gelatine, in certain proportions. When the exposed metal comes in contact with this sensitized paper, a colored complex dark blue cyanide is formed which indicates the position and the size of the pinhole. The blue spots indicate pinholes down to an iron base, while brown spots indicate those to a copper or brass base.

Used in Tinplate

The head of the laboratory procured a test piece of tin plate two feet square. It was an average-looking sheet, that to the eye showed no pinholes. All possible grease and dirt was cleaned off, using a cotton swab dipped in benzol. A sheet of Ferracco paper smaller in size than the sample was thoroughly moistened with distilled water and firmly and evenly pressed against the tin-plated surface.

The blue spots that indicate the position of the pinholes began to show in about five to ten minutes, even through the reverse side of the test paper. The paper was allowed to remain twenty minutes when it was removed and thoroughly washed and dried. This sheet of test paper then became a permanent record of the test.

With slight variations in the manipulation of the test paper, other protective coatings are tested for pinholes. In chromium and nickel plating on copper and brass, it was found best to moisten the paper with a solution of ammonium citrate and ammonium carbonate instead of distilled water. When the base metal is iron or steel, distilled water alone should be used, otherwise the blue stain will be retarded in its formation.

To test over-buffed plating, i.e., plating where excessive buffing has thinned the plate almost to the base, Ferracco paper plainly shows areas of light brown or blue.

Another use for this test paper is the detection of minute holes in thin metal foil. The foil is laid on an iron plate and the paper used as in the tin plate test. Blue spots will show the location of pinholes in the foil.

Ferracco pinhole test paper is claimed to be simple to manipulate, saves time and material and leaves a permanent record for research files and production control data.

Ball Bearing Punch

The Excelsior Tool and Machine Company, East St. Louis, Ill., has made an addition to its line of punching tools in its ball bearing lever punch No. 19. This punch is useful on erecting or assembling floors where metal parts are fit and punched or drilled. Some of the advantages are as follows:

Ball bearings on eccentric and main shaft.

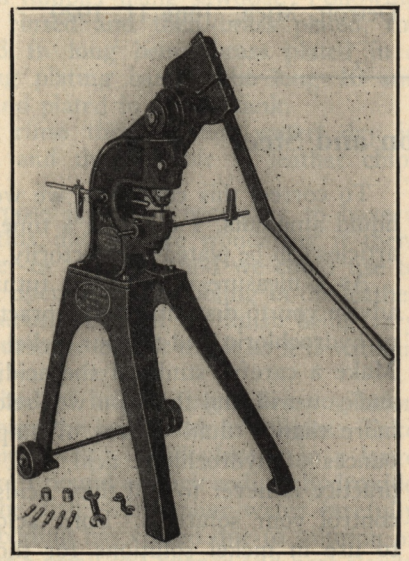
Stand with forward protruding legs so that the machine cannot tip when punching.

Balanced lever so that the handle is always in upright position.

Stripper does not obstruct the view of the punch.

Front and side gauges are adjustable to requirements.

The slide is square with provision to take up the wear so that the most delicate odd shape punches and dies can be used without injury.



Lever Punch

Large Pressure Tanks

The Paasche Airbrush Company, 1909 Diversey Parkway, Chicago, Ill., is manufacturing a line of stationary pressure tanks for large finishing production. These tanks, called "Clamptight," are said to be fast operating, with no nuts or bolts to tighten or wrenches necessary. The user simply turns the levers over and the cover is on or off quickly. Each clamp is adjustable with washer shims for proper tension, and once set, tightens uniformly. They are one-piece pressed steel tanks and consequently easy to clean, the makers state.

Nickel on Steel

To the Editor of BRASS WORLD:

We have and thank you for your letter of July 2 and report on our problem of nickel plating on steel.

We feel you have given us exactly what information we needed and appreciate it.

UNITED STATES LOCK AND HARDWARE CO.,
Columbia, Pa., July 8, 1929 By P. R. Baker.

The Dust Arrester—Its Industrial Application

Dust and its suppression are today engaging the minds of some of the finest engineering talent in the country, says R. J. Hutchinson of The American Foundry Equipment Company, Mishawaka, Ind., writing in THE METAL INDUSTRY for July. The dust nuisance in manufacturing processes entails evils, he declares, which are too well known to require more than passing mention: it slows production, impairs the health of workers, wears out machinery, reduces efficiency generally; and many processes must involve the creation of dust, as in grinding, polishing, and other operations of prime importance. He goes on to say:

A dust arrester is simply a metal house divided into two sections by a screen of cloth. In its elementary form it would be a hollow cube, with one plain cloth screen sealed to the side walls, ceiling and floor, midway between the ends of the box. The greatest possible cloth area in a minimum cubic foot space is attained by a staggered effect, stretching parallel cloth surfaces over a frame so that they will be separated by an inch or so, and hanging the screens parallel to each other so that they project outward like the fingers of a hand.

On one side of the screens, the dust laden air enters the arrester under suction from the fan. Much of the heavier dust falls into the hopper of its own weight, as soon as the velocity of the inrushing air is lowered on entering the larger expansion chamber. Incoming air is thus dropped from an average velocity of, say 4,000 feet per minute, to a velocity of only a few feet a minute, no longer sufficient to support heavy dust.

On the other side of the screens is the "clean air side" from which the clean air goes directly through the fan and is discharged back into the building, saving a large item in coal.

Departing from the hit-and-miss practices prevalent until a few years ago, engineers now figure arresters on a scientific basis which assures the velocity of air passing through the cloth to be not more than three or four feet per minute. This creates no actual pull of any consequence, so that dust particles in the air adhere to the fibers of the cloth and are strained from the air as it passes through the pores.

Naturally, in order to prevent the fibers of the cloth becoming overloaded, plugging the pores, and setting up a prohibitive suction to get the air through the cloth, it is necessary to dislodge all accumulated dust at regular periods during the day's operation. This is accomplished by mechanical or pneumatic vibrators preferably the former, the object being to strike the edge of each suspended screen a smart blow, imparting a uniform vibration to the entire cloth surface by means of stay wires attached to the frame, and whipping or beating out all particles of dust so that they are dislodged and fall into the hopper. Naturally, it is necessary to shut off the fan while this is being done, as otherwise the dislodged dust would be sucked through the cloth.

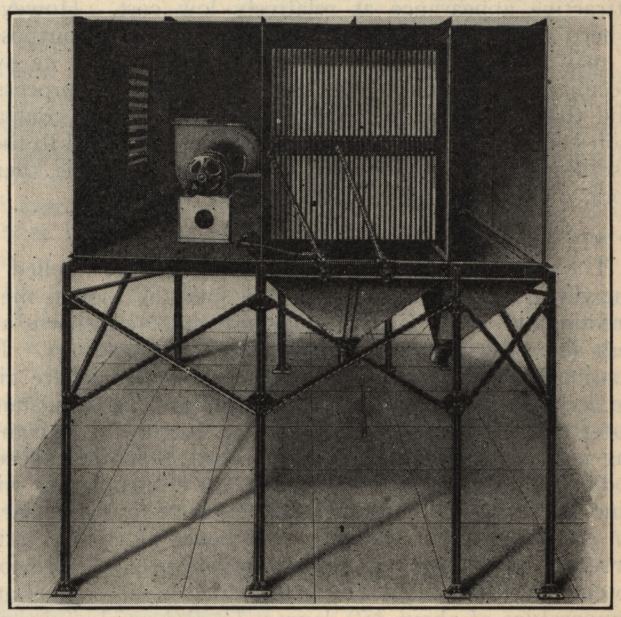
Many types of vibrating mechanism have been employed, all developing some inherent weaknesses which have caused engineers constantly to search for the ideal method of vibration. The American Foundry Equipment Company has recently brought out a new and apparently much superior device known as the Ball Rapper, which functions on a principle entirely new.

The improved rapping or vibratory device which is an important part of American arresters, insures the entire cloth covering of every screen being thoroughly freed from dust without injury to either the screen frame or the cloth.

The rapper consists of an electrically driven arm, tipped with a hardened steel ball. The bank of screen across which the ball rapper is equipped with steel shoes on the edges to receive the blow. Each screen is struck a positive rap which dislodges all dust.

This method of rapping has proved itself far superior to previous types such as pneumatic or electric hammer for two reasons. First, it treats each screen individually, eliminating the former slow destruction of screen frames through too severe shaking and plugging of the cloth through insufficient vibration, which were the most notable drawbacks of the two previous types.

In addition, and besides insuring against the sticking prevalent with pneumatic types in cold weather, when freezing of moisture in the air line is an element to be considered, it insures screens at the ends of the bank being just as efficiently rapped as those in the middle, with a consequent longer period between recovering the screen frames.



Cloth Screen Dust Arrester with New Rapping Device

The construction of the new style rapping device is shown in the illustration. At the right is a setting chamber to drop velocity and precipitate coarse abrasive particles before the air passes to the screen chamber. Screens are suspended as shown in the middle section, the motor driving the ball rapper being attached outside the casing. At the left is a fan house, enabling the exhaust fan to be placed in its most advantageous position directly outside the arrester shell.

It is interesting to note that the heat lost by a small system, exhausting only 5,000 cubic feet of air a minute into the outside atmosphere, is, in freezing weather, equivalent to using 1½ tons of coal per month. Arranged to discharge inside the building, a cloth screen arrester provides clean air with no heat loss—a saving in overhead and an improvement in working conditions within the plant.

A Comparison Between Metal Coating Processes

How Metal Coatings Are Applied and Their Fields of Usefulness

BY DR. JAMES SILBERSTEIN

WRITTEN ESPECIALLY FOR BRASS WORLD

THERE are at present four different ways by which metal coatings are commercially applied. These are the following:

1. Hot dipping.
2. Electroplating.
3. Diffusion (sherardizing).
4. Metal spraying.

Where coatings are applied only for the sake of appearance, there is little doubt that the electroplating process is the most practical one, since it furnishes an attractive appearance at relatively low cost. However, where coatings are applied for rust protection purposes, it may be said that each established process has its own peculiar application to the exclusion of other processes and that the metal industry needs them all. A comparison between these different processes with regard to their usefulness and cost for rust protective purposes is, therefore, of interest and will be given in this article.

Hot Dipping Versus Galvanizing

The two metals which are most extensively applied by the direct insertion of the article into the molten metal are tin and zinc. Tin coatings are more expensive and less able to withstand corrosion than zinc coatings. Tin coatings are therefore applied only in cases where zinc on account of other reasons cannot be used, as for instance for food-containing materials. Zinc coating or galvanizing is probably the most common rust preventing process today. This process, as compared to electroplating with zinc, is more rapid, although articles have first necessarily to go through the cleaning treatment—as in the latter process—to remove rust, scale, dirt and grease. Previous to entering the molten zinc bath, which is maintained at a temperature of about 450 degrees C., the article is treated with a mixture of salammoniac and zinc chloride acting as a flux. On leaving the bath, excess zinc is removed mechanically.

The rust resisting properties of the coatings obtained depend, to a large extent, on the temperature of the bath which, in order to give standard results, should be kept within a definite small range. When small articles are to be galvanized, the temperature should vary between 450 and 470 degrees C., and when larger parts are to be galvanized, between 470 and 490 degrees C. Since the rate of solution of iron in zinc increases with increasing temperature, and the iron content should be kept as low as possible, it is important to maintain close temperature control. In the case of larger installations, this is subject to reasonable control, which is not so rigorously applied in small plants.

Thickness of the galvanized coating may vary between 2 and 5 thousandths of an inch, corresponding to about 1½ to 3 ounces of metal per sq. ft. This compares with the thickness of ½ to 1 thousandth of an inch—which is considered ample for efficient protection—in the case of electro-deposited zinc. The regularity of the electro-deposit is again superior to the galvanized coating. Whereas the thickness of the plating may be arbitrarily fixed by the plater to very fine limits, thickness of a galvanized coat cannot be controlled to any accuracy.

The noteworthy difference in the thickness of deposits amounting to a ratio of from 2 to as much as 10 represents an appreciable change in the cost of zinc in the long run. Against this has to be set the time factor, which is of course greatly reduced in the case of galvanizing.

The fact that all articles submitted for galvanizing must necessarily be heated to a temperature of 450 degrees C. is a further disadvantage, which is absent in electroplating, the highest temperature in use in the latter process not exceeding 100 degrees C. The mechanical properties of iron and steel, which is galvanized may thus be seriously affected, and it is, for instance, not to be recommended to galvanize springs.

One of the principal and most important differences, however, relates to the composition of the coating, which is markedly different in the two processes. The deposit which is obtained electrolytically, consists of almost pure zinc, that from the galvanizing tank is, owing to the solvent power of molten zinc for iron seldom purer than 98.5% and may contain impurities up to 3% and more. It is not of advantage to use the purest grades of zinc in galvanizing, since it has been established that the pure zinc more readily takes up iron. Another disadvantage of using pure zinc is, that the surface of the metal oxidizes quickly, producing a dull luster, which is undesirable. This is not noticeable the first few days after the galvanizing tank has been filled with the purer grade of zinc, but it is more marked as time goes on. The presence of impurities and oxides considerably reduces the protective value of the zinc coating since corrosion is initiated at the places where the impurities segregate out and is accelerated by them. It should be mentioned in this connection that even if it were satisfactory to work with a pure zinc bath, the composition of the latter, owing to solution of part of the iron of the articles immersed and also of the containing vessel would very soon show a high iron content; so that the production of a galvanized coating of pure zinc is hardly feasible.

The difference in the composition of coatings between the various metal coating processes is illustrated in figs. 1 to 4. The information of an intermediate compound between the base metal and the coating proper has given rise to varying opinion as to its effect or otherwise in adding to the protection afforded to the base. It has been stated to be detrimental, but its effect may probably be considered to vary with its depth from the surface in contact with the atmosphere. Provided this depth is great enough to avoid any possible electro-chemical effects produced by the junction of two metals, the alloy phase can have no detrimental influence. Otherwise—and especially if the deposit is porous—the alloy phase will lessen the resistance to corrosion.

From the economic viewpoint it is probably still cheaper to apply a galvanized coating on the majority of articles, although the margin is not substantial and may entirely disappear, according to the manner in which the process is carried out. One serious item of expense, which appears to be inherent in the galvanizing process but is entirely absent in the electrolytic process, is the loss caused by the

constant formation of dross and oxides. It is probable that the most useful field for galvanizing lies in the coating of comparatively large articles, for example sheets, which would require the laying down of a special plant, were an electro-deposit required.

Sherardizing

This process has been in use for some twenty years. The coating is produced by placing the articles in intimate contact with zinc dust in a metal container, which is then subjected to heat while the container rotates. A gradual diffusion of zinc into the surface of the iron articles takes place, the extent of this depending on the temperature attained within the drum and the period of time devoted to the treatment. Both these factors may be varied considerably; the temperature within 350 to 550 degrees C. and the time from one to two hours. At the conclusion of the process the articles, after cooling, are separated from the zinc dust and found to be covered by a dull, grey coat of zinc, which is remarkably uniform in its surface regularity. A thickness of from one to two thousandths of an inch is generally aimed at.

The application of the process is necessarily limited to articles of small size, which may be conveniently packed in the drum. In comparison with the electrolytic process there is no necessity—as in the latter case—to string these small articles on wires, although the wired articles are advantageous in handling during the cleaning operations. Acid may be used for cleaning purpose, but the best results are probably obtained by sandblasting the surface. In regard to the time factor, the sherardizing process is at some disadvantage.

The structure of the coat produced is quite different from both the electro-deposit and the galvanized coat. The actual composition depends on the quality of zinc dust employed; the purer the latter, the purer the surface layers. There does not appear to be any definite break in the iron content of the various layers, this increasing progressively as the iron base is approached.

Variations of the process have been commercialized under different trade names, one process claiming the definite formation of a fairly thick zinc oxide protective layer, tenaciously held and permanently combined with the zinc surface. In another process a proportion of cadmium is added to the zinc, and the combination has been shown to be much superior, as a protective, to the zinc applied alone.

As with the galvanizing process one of the drawbacks is the temperature to which the iron and steel articles must be subjected. The appearance and color of the deposit is distinctly inferior to both the electrolytic and galvanized zinc. The thickness of the coating is, however, more readily controlled than in the latter process—although not as finely as in the electrolytic—and provided a fair tolerance is allowed, the process is eminently suitable for all kinds of small work, such as screws, bolts and nuts, washers, cams, hooks and smaller fittings generally. For such articles the sherardizing process is the method to be chosen from an economical point of view.

Schoop Spray Process

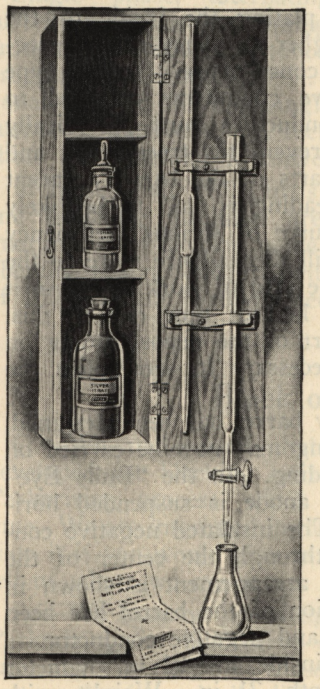
One of the most direct methods of providing a metal coat, which has been developed and applied to a considerable extent during recent years, consists in spraying the molten metal upon the article which it is desired to coat. This is known as the Schoop process, after its inventor. A spray of molten metal is directed from a "pistol," in which an oxygen-hydrogen flame is burning, the metal, in the form of wire, being fed to this flame from which it is projected by air pressure. The deposition of zinc, lead, tin and aluminum present relatively little difficulties, and even metals of high melting points, such as copper, may be deposited in this way.

There does not appear to be any alloying effect between the sprayed metal and the base, and the manner in which adherence is effected is speculative. From the fact that the metal is at quite a low temperature a short distance from the pistol, it is inferred that the great velocity with which it leaves the pistol (stated to be approximately 3,000 ft. per second) causes it to liquify as a result of its violent impact with the surface upon which it is directed. Immediate contraction on solidification probably causes the sprayed metal particles to "grip" on to the surface crystals of the metal coated; at any rate a surface which is rough, is found to be the best for spraying, and accordingly, articles are subjected as a rule to preliminary sandblasting.

As with the Sherard process a matte deposit is always obtained, as would be expected. Although the process is comparatively costly—from three to six times as costly as galvanizing—its most valuable application, in which it is unrivalled by any of the other processes, is apparent; it consists in applying metallic coatings to surfaces which, owing to their size and position, cannot conveniently be treated in any other way than by the use of a mobile coating apparatus. It is thus specially adapted for such work as the interior of tanks, bridge and open air structures and assembled or completed units generally. Since it is without competition in these cases, it is idle to compare costs.

It is seen from the foregoing that each of the processes which have been described has a special sphere of application for which it is particularly suitable, while at the same time there are also distinct limits to the exploitation of each. Careful consideration of each particular problem is obviously necessary before a decision of the best process to adopt should be made.

Apparatus for Solution Analysis



Analytical Apparatus

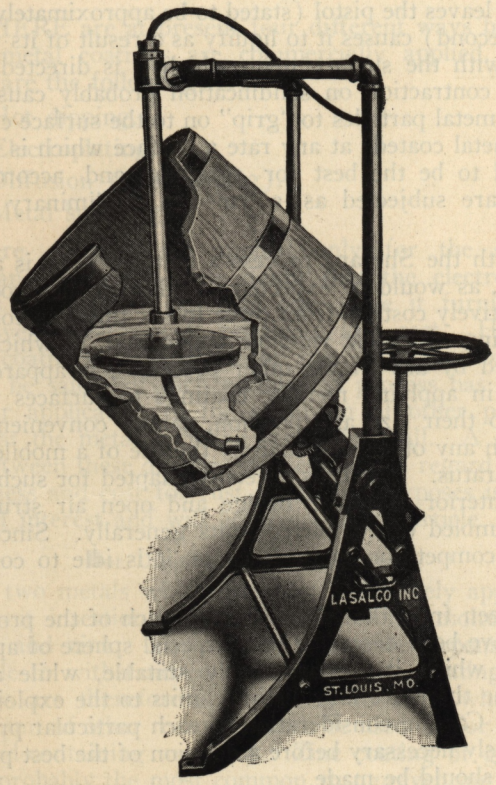
Apparatus has been developed by the State Manufacturing Company, 4722 S. Turner Avenue, Chicago, Ill., for determining the sulphate content of chromium plating solutions. This apparatus is said to provide a rapid and accurate method, and direct-reading. The time consumed in making such a determination is seven minutes.

This company is also placing on the market an apparatus for determining the chlorides in nickel plating solutions; also by the direct reading method, in ounces per gallon.

Such laboratory equipment is in line with the trend in the plating industry, toward rapid and practical ways of scientifically controlling solutions.

Tilted Plating Barrel

Recently designed and placed on the market is a new type of tilted mechanical plating apparatus manufactured by Lasalco, Inc., 2822-38 Lasalle Street, St. Louis, Mo., long engaged in the manufacture of equipment and supplies for electroplaters, polishers, etc. The new barrel is known as the "Bulls Eye" and is equipped with Lasalco "Bulls Eye" anodes, which embody the center



New Type Tilting Plating Barrel

negative conductor, claimed by the manufacturer to enhance the barrel plating process considerably.

The makers state that the new type of tilted barrel will plate the load without plating the inside of the barrel thereby making for higher efficiency in the process, with reduced cost as a consequence. In the type of barrel having the negative conductors attached to the barrel, they state, the conductors must periodically be removed and cleaned to prevent the treeing out and spreading of the deposit to parts of the barrel adjacent to the connection. This spreading is said to be likely to continue and become a source of serious inefficiency in operation, as the deposit will then adhere more to the inside of the barrel than to the load of work placed in it for plating. There is great loss of time due to this, they state, as with only a part of the deposit going on the load, a longer time is necessary to accomplish the desired finish.

With this in mind, the new barrel has been designed, it is claimed, and barrel plating may now be carried on without the detrimental spreading. In the "Bulls Eye" apparatus, the circle-grooved anode is suspended horizontally over the cathodes. The insulated negative conductor is conveyed directly through the center of the anode to the cathodes. The arrangement is shown in the illustration, where a portion of the barrel has been cut away to show the anode and negative conductor.

Dimensions of the barrel, inside, are 21 in. diameter at top, 24 in. at bottom; depth, 21 in. Weight, with belt drive, approximately 600 lbs.; requires 4 by 5 ft. floor space. With motor drive, weight is about 700 lbs. and same floor space is required. Standard belt drive has tight and loose pulleys, 16 by 3 in. For motor drive, one-half horsepower motors of desired current are supplied.

Plant Lubrication Equipment

A special type of apparatus for the lubrication of plant machinery, vehicles and other apparatus requiring lubrication is manufactured by the Dot Lubricating Equipment Company, a division of the Carr Fastener Company, Cambridge, Mass. The Dot company also supplies lubricants of various types.

The equipment offered for plant use and for heavy vehicular use has been designed for bearings which must be kept free of dust and grit which might tend to impair the parts. The company's outfit known as the "Nozzle-Fil," consists chiefly of a barrel pump for drawing the lubricant from the drums or barrels in which it is stored, a filling tank into which the lubricant is transferred for carrying to the machinery or vehicle to be lubricated, and a gun for the actual work of lubricating. These three pieces of equipment are shown in the illustration. Other equipment such as pressure cups for attachment to machinery or vehicles, nipples of various angles by means of which the "Nozzle-Fil" gun is applied, and the lubricant are also supplied by the Dot company.

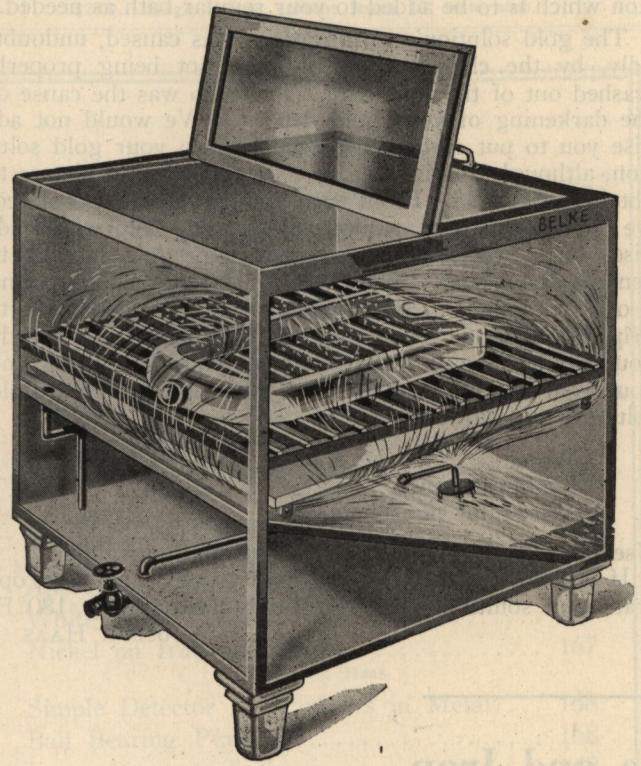
Describing the use of the "Nozzle-Fil" equipment, the makers state that the barrel pump is attached to the drum of lubricant. By its use, the hand filling tank which the operator can carry is filled with lubricant without danger of dirt or grit getting into it to injure bearings. After the tank is filled at the barrel, the operator carries it to the equipment to be lubricated, where he sets it down. He then takes the hand filling pump and fills it from the filling tank by means of a pump on the small tank. He then attaches the gun to nipples or pressure cups on the vehicles or machinery he is lubricating and proceeds to force the proper amount of lubricant into the bearings by twisting the handle of the gun.

It is pointed out that the grease throughout the operation—from drum to bearing—is not exposed to the air for more than a few seconds, which, the makers claim, eliminates all danger of dirt or grit entering it.

Barrel Pump, Hand Pump and Hand Filling Tank for Lubrication

Salt Spray Testing Equipment

The Belke Manufacturing Company, Chicago, Ill., manufacturers of plating equipment, testing devices, etc., have just designed and placed on the market a new type of apparatus for salt spray testing. The new equipment is said to be built on entirely new lines, differing from those of the salt spray testing equipment



Salt Spray Tester

the company has been marketing from some years and which have found wide acceptance among metal finishers, platers, etc., according to the makers.

In introducing the new equipment, the Belke company states that the importance of adequate tests of metallic finishes should not be underestimated. Plating production without definite means of ascertaining the quality of plate produced is inadvisable, and mere examination by eye is not always a good measure of the properties of the plate. Salt spray tests, they claim, aid in overcoming the risk of poor results with consequent necessity of replating or refinishing.

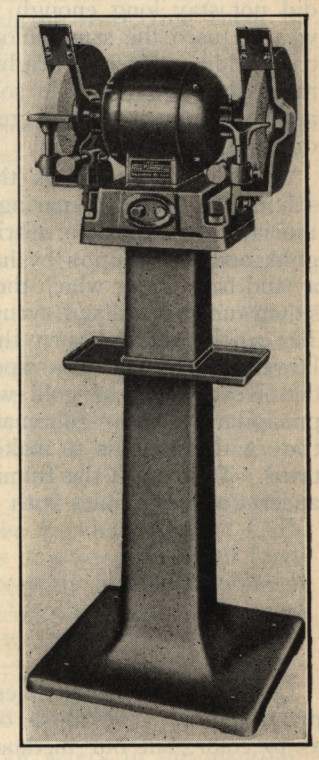
The new testing apparatus shown in the illustration is larger than the company's older product. This unit is a square tank of white enameled steel, with Monel trimmings and glass top, mounted on legs. It is equipped with a sloping drain and glass rack for articles to be tested. It is gas tight and adapted to testing plating of various kinds. This new machine is said to be based on the same general principles which have characterized the other unit.

The Bureau of Standards, commenting on the Salt Spray test have found: "Although the salt spray test is subject to objections, it may be regarded as the best test for zinc coatings. A sample showing rust spots in 24 hours should be set aside as unsatisfactory, while a sample that would withstand two or three days could be relied on as to the plating. Any test which will effectively show the presence, number and approximate size of breaks or pinholes in a comparatively short time (usually 3 to 10 hours) may be used to include in a general way the quality of the coat applied.

Aside from what is claimed to be the highly efficient design of this Belke product for testing purposes, its appearance is attractive, giving the whole equipment a clean, white effect.

Electric Grinding Machinery

Hill-Curtis Company, Kalamazoo, Mich., manufacturers of polishing equipment, have just introduced a new line of 6 and 8 inch electrically driven grinding machines, one type of which is shown in the illustration. These machines are made for either bench or pedestal use, and they can be supplied for either direct or alternating current. The machines are equipped with high grade, oversize ball bearings, mounted in the end head in close proximity to the wheels, all bearings are completely enclosed and protected from dust and grit. This machine, like all Hill-Curtis electrically-driven grinding and polishing machines, is enclosed and dust proof, having no holes or open slots in the motor housing or end bells, thereby eliminating possible danger to windings by the accumulation of emery grit, dust, or other particles of dirt.



Pedestal Type Electric Grinder

Two-pole underwriters' approved quick-make-and-break switch is standard equipment. The wheel guards and tool rest are adjustable to the wear of the wheels and can be quickly removed when the type of operation does not permit their use.

Single phase, alternating current machines are equipped with improved commutating type repulsion-induction motor, which has no dragging centrifugal switch. Low voltage has no objectionable effect on this single phase machine. Starting current is unusually low, thereby making it the ideal machine for attaching to convenient lighting circuit outlet.

Motors in all Hill-Curtis electrically-driven grinding and polishing machines are enclosed and dust proof, guaranteed to develop name plate power rating and are liberally proportioned to withstand momentary overload of 100 per cent beyond rated capacity.

Black on Steel

Q.—We understand that a new process has been developed for blacking cold rolled steel, other than the Parkerizing process, which has been known for some time. We are interested in this finish and we would appreciate it if you would give us the name of the process and tell us where we can secure some additional information.

A.—We have no knowledge of any process other than Parkerizing for blackening cold rolled steel, nor do we have any knowledge of those who may be practicing any process that is markedly different from the Parker process.

—Joseph Haas.

Dissolving Gold for Plating Bath

Q.—I recently took a new position in a plating shop. The man whom I succeeded failed to show me much about his gold solution. A few days before he left he tried to show me his method of adding gold to a solution. It was about as follows:

He took 2 oz. gold and placed it in a solution of muriatic and nitric acid, waiting until the gold was all cut up, then placing it in water, adding ammonia, and allowing it to settle. He repeated this several times, then he added cyanide. When placed in the bath, the whole thing turned very dark. I have had the same trouble since then, as he did not stay long enough to show me what the trouble was. I used the same chloride he had prepared. I have tried adding silver to brighten up the solution. This has resulted in a green gold solution. Can you give me any advice? I want a good gold solution to produce an ordinary gold plate.

A.—The following is the correct procedure for dissolving gold and preparing it for the gold bath. Take muriatic acid 3 parts, nitric acid 1 part, pour over the gold, and aid solution by having the evaporating dish on a sand bath under which there is a small flame. Evaporate slowly until thick and syrupy, to evaporate excess acids. Be careful not to burn the gold. Then transfer to a larger jar, rinse out evaporating dish with water and dissolve chloride of gold with water. Add ammonia to precipitate gold as fulminate, then filter. Test first filtrate with ammonia to make sure that all gold is precipitated. Then wash the fulminate of gold upon filter paper at least a dozen times with large volumes of water. This is to wash out nitrates and chlorides. Do not allow fulminate of gold to dry; it is explosive.

In the meantime have dissolved a saturated solution of cyanide, and, after washings are complete, pour over fulminate of gold, and collect cyanide gold solution in a jar or bottle. This should constitute your stock gold solution which is to be added to your regular bath as needed.

The gold solution's turning dark was caused, undoubtedly, by the chlorides and nitrates not being properly washed out of the fulminate. This also was the cause of the darkening of your gold deposit. We would not advise you to put carbonate of copper into your gold solution, although this is done by experienced gold platers to obtain a rose gold. From what your problem is, as stated, we believe you wish a pure yellow gold. We would advise you to work out the silver in your gold solution to remove the green. Then add gold stock solution and 2 ozs. per gallon of trisodium phosphate, which tends to help deposition of yellow gold. If that should not remedy your trouble, the only thing left for you to do is to send your gold solution to the refiners and make up a new gold solution, as follows:

Water	1 gallon
Sodium cyanide	1 oz.
Trisodium phosphate	2 ozs.

Use stock gold solution with 1 Dwt. gold per gallon.

If you are depositing heavy gold 10 to 30 minutes, operate your solution at 120° F; if only flash gilding, 180° F.

—Joseph Haas.

Antique Bronze and Iron

Q.—Enclosed are samples of cast bronze hardware we manufacture. The finish on these pieces is satisfactory as to color, but our method of getting it is complicated and expensive. Can you tell us a simple means of getting this finish? It should be fairly non-corrosive.

We also want to know how to put a dull, non-corrosive, antique iron finish on the same kind of cast bronze hardware. This also should be the simplest and least expensive finish possible, although we do not wish to sacrifice results in favor of saving on costs.

A.—The samples are finished in an antique bronze finish and produced in the following way: Cleanse thoroughly with alkaline cleaner and bright dip; without drying, immerse in the following solution: copper nitrate, 1 lb.; water, 1 gallon. Then, without drying, place on hot plate and heat with gas flames until black smut is produced. Then relieve highlights with a soft piece of felt or a linen rag. The finish is usually preserved by waxing.

To produce an antique iron finish on cast bronze, it will be necessary to plate the work in an iron solution. Formula for iron solution:

Ferrous chloride	40 oz.
Calcium chloride	45 oz.
Water	1 gallon

Temperature 190° F. 180 amperes per square foot.

After the work is iron plated, it is painted with a solution of sulphur that has been dissolved in turpentine and then heated on a hot plate or gas flame until a smut is produced. Relieve with a piece of soft felt and then wax.

This method of producing an antique iron may require a little experimenting before it is found satisfactory.

The deposit of iron is no more rust proof than ordinary wrought iron, but the finish protects it against corrosion for a considerable time when exposed to atmospheric conditions.

After cleansing in the alkaline cleaner it is advisable to pass the bronze articles through a bright dip and reclean in alkaline cleaner to make sure that the surface is absolutely clean before placing in the iron bath.

The cathode should be agitated to obtain a smooth deposit and the anodes, which are of rolled iron, are suspended in porous pots to prevent particles from the anode reaching the cathode and causing a rough deposit.

As the metal concentration of this solution is quite high, it is necessary to use a temperature of 190° F., and a deposit of .003" is obtained in 1 hour with a current density of 65 amperes per square foot. The solution practically maintains itself with metal from the anode, and if not used for some time will not deteriorate.

—Oliver J. Sizelove.

Chromium Solution Formula

Q.—I would like to have a formula for a chromium plating solution together with directions for using such a solution.

A.—Formula for chromium solution:

Chromic acid	55 oz.
Sulphuric acid	0.3 oz. by weight
Water	1 gallon

Temperature, 95° to 100° F.; cathode current density, 35 to 50 amperes per square foot. Use 6% antimonial lead anodes. The tank should be made of iron and glass lined.

—Oliver J. Sizelove.

BRASS WORLD

And Plating — Polishing — Finishing

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Electroplaters' Officials Re-Elected

THE American Electroplaters' Society has paid the signal honor to its officials of re-electing them in a body for the year 1929-1930. These officials, Horace H. Smith, C. A. Van Derau, W. J. R. Kennedy, George Gehling and F. J. Hanlon made such a remarkable record during the past year that the Society felt it their due to keep them in office, and also that the best interests of the Society would be served thereby.

We sincerely congratulate these gentlemen on their outstanding achievements, and also the Society upon its good fortune in having such men of ability and integrity to carry on its work.

The International Fellowship Club, the official organization of electroplating salesmen, also is breaking all records for popularity and effectiveness. The Detroit meeting was the best attended in the history of the Club and the speakers were deservedly greeted with enthusiasm. The International Fellowship Club is well on its way to become a power in the electroplating trade. How important that power will be for good can be judged from the code of ethics which is the backbone of the Club.

The electroplating industry is now becoming well fortified. It remains only for the recently formed Equipment and Supply Manufacturers' Association to keep step with the other organizations in its line.

Dust Versus Safety

ONE of the worst enemies of safety in the manufacturing plant is dust. There is no factory without it, and among those peculiarly susceptible to this evil are plants doing sand casting, grinding and polishing.

The character of such trades makes it impossible to prevent the formation of dust; consequently strong measures must be taken to keep it from injuring the men. Powerful exhaust systems are not enough. They must be laid out with care in order to remove the dust before it gets into the air. For example, an outlet placed in such a manner that the dust will be drawn past the men in the room is just as bad as no outlet at all as the men will inhale the dust as it passes them. The dust should be drawn off just as it leaves the machine where it is formed.

Dust is an insidious enemy. It is often present in quantities too small to be noticed by city dwellers, who are accustomed to bad atmosphere. It is nevertheless dangerous because its effects are cumulative. While the dust itself may be non-poisonous, it is very likely to be a mechanical irritant. Health Practices Pamphlet No. 4, published by the National Safety Council of Chicago, lists the effects of dust inhalation, among which are weakened lungs resulting in such diseases as pneumonia, tuberculosis, etc.

Safety in the plant means more than the prevention of accidents; it should also mean the elimination of occupational diseases and the many forms of lowered health and resistance which may be caused by bad working conditions.

Questions and Answers

All inquiries are answered in the order received and, whenever possible, the answers published in the next regular issue

Black Nickel on Silver

Q.—Please give me information on black nickel. I have some bronze castings to silver plate and then finish in a blue black, which I think is black nickel. What chemicals are used to make the solution and what kind of anodes are used?

How must bronze castings be polished for silver plate? Must they be buffed or not? Will a 120 emery finish be good enough for a black nickel plate? I have no sample or I would send it to you. The door plate shows blue black on each end; center is satin silver with a gloss lacquer on it. How will I get the black off in center without injury to the silver?

A.—Whether you buff your castings before silver plating depends upon the results you wish to obtain. If you wish a smooth finish, buffing is necessary; if only a satin, an emery finish is sufficient.

A formula for a black nickel, soft and easy to relieve, is as follows:

Water	1 gal.
Double nickel salts	8 oz.
Zinc sulphate	1 oz.
Copper sulphate	¼ oz.
Sodium sulpho-cyanate	2 oz.

Plate at not more than ½ volt.

You relieve the black with a soft rag wheel moving at 1,000 r. p. m., using pumice stone and water. You must use judgment on how much pressure to apply in relieving in order to avoid cutting through the silver. After relieving with the rag wheel, lightly scratch-brush with clean water and dry lacquer.

—Joseph Haas.

Blue-White Finish

Q.—Please to accommodate us with a formula for a white finish similar to white gold. We have a lot of articles that come to us that have been chromium plated, but where the plate has worn off. We have to take off the chromium and refinish it white, with either a white gold or some other kind of a blue-white finish similar to the color of chromium plate.

A.—We recommend that you refinish the articles in chromium. However, if you do not wish to do that, or have not the facilities, the only thing left for you to do is to cadmium plate your articles. Use this solution:

Water	1 gal.
Cadmium cyanide	5 oz.
Sodium cyanide	6 oz.
Sodium hydroxide	1 oz.

The solution is operated at 3 to 4 volts.

—Joseph Haas.

Chromium Plating Practice

Q.—I am using a solution of chromic acid, chromic sulphate and iron sulphate. My work is not satisfactory, however, as part of it comes out dull and part bright. Can you tell me if I should hang the work in the solution before I turn on the current, or would you advise me to turn in the current before I put the work in the solution? I am using 8 volts and 400 amperes, leaving the work in the solution for one minute. Do you think my solution and method are good?

A.—Many are obtaining very good results with the solution you are using. The usual commercial practice is to have the current turned on before placing the articles into the tank. Since we know of cases where similar trouble was eliminated by having the current turned on, we believe your difficulty will be eliminated if you also follow this practice.

—Joseph Haas.

Cleaning Lead-Zinc Alloys

Q.—We will be very pleased if you will kindly inform us of the procedure of washing and cleaning metal for plating. The metal has a zinc and lead base. We have been using gasoline, but this is very hazardous.

A.—While cleaning lead-zinc base alloy articles with gasoline is admittedly a hazardous and also disagreeable method, we doubt very much if you will find one that is as efficient and that will not discolor your articles. You might try soaking in a 2 oz. solution of whale oil soap to loosen the tripoli and then in a vertical agitator clean with soap chips, about 5 lbs. to 100 gallons water. The articles are handled in baskets, the whale oil soap is kept boiling and the soap solution luke warm.

—Joseph Haas.

Coating Brass with Lead

Q.—We would like to avail ourselves of whatever information you are in a position to give us as to a practical production procedure for coating brass castings with lead in about the same manner as battery terminal attachments are coated. The pieces are irregular in shape and weigh about 2 oz. each.

A.—After the castings are removed from the gates, tumble with steel jacks in water. This will remove all the sand and give you clean castings. Your "leaching" unit, consisting of the following units, should be arranged in such a manner as to conserve both time and physical labor.

1. Rectangular tanks with clean cold running water.
2. Bright dip,

Nitric acid.....5 parts
Sulphuric acid.....2 parts

in a 50-gallon jar, standing in the rectangular tank of (1).

3. Small hot water tank.
4. Zinc chloride flux tank.
5. Molten lead bath-temperature maintained at 50° F. above melting point of lead with pyrometer, and well covered with charcoal to prevent oxidation.
6. Hot water tank with inclined panels on front to roll baskets on.
7. Sawdust tumbling barrel.

With the castings in baskets, immerse in the bright dip, rinse thoroughly in cold water and then immerse in the hot water. Then into the zinc chloride flux. After shaking off excess flux, immerse in molten lead bath. The operator should wear goggles, have a heavy leather apron, and his hands should be protected with leather gloves, as the lead will spatter. With a hook and chain arrangement the basket can be lowered into the lead with less danger to the operator. The castings are allowed to remain in the lead bath about 2 minutes to thoroughly heat them through. They are then removed and briskly rolled on the inclined panel on the front of the hot water tank. This is to remove excess lead, and then quenched in the hot water. They are then tumbled in the sawdust tumble.

—Joseph Haas.

Gun Metal on Steel

Q.—I am sending you a buckle with gun metal finish. I should appreciate the formula for this finish as I could use it to great advantage on steel parts.

A.—The buckle is case hardened steel and then highly burnished with steel balls in a burnishing barrel. From tests made upon the finish, we are confident that it has been produced by the nitrate process. In an iron pot melt:

Sodium nitrate .....2 parts
Potassium nitrate .....1 part

Keep this mixture thinly molten, but do not allow it to smoke. If your steel buckles are immersed in this mixture in baskets (take care to shake up a little so that action is uniform, they will turn the same color as the sample. Remove and plunge into warm water which will remove salts. Tumble in sawdust or leather meal to brighten.

—Joseph Haas.

Low pH and Chloride in Nickel

Q.—My nickel solution has been giving me quite a bit of trouble. I am sending a sample for analysis.

I recently tried to improve my work by completely overhauling the solution. Now I find that the work peels a great deal, whereas previously I had had no such difficulty.

A.—Analysis of nickel solution:

Metallic nickel .....3.18 oz.
Chlorides .....0.92 oz.
pH 5.2

The pH of the solution is too low; so is the chloride content. Add 6 oz. of 26° ammonium hydroxide to each 100 gallons of solution and also 1 oz. of ammonium chloride to each gallon.

Look also to your cleaning methods. You may find that some of your trouble is caused by improper cleaning.

—Oliver J. Sizelove.

Nickel Under Chromium

Q.—Would you kindly give us the formula for a bright nickel plating solution for barrel work? We would like to chromium plate over the nickel. What kind of a barrel would you suggest using?

A.—If you have any idea of chromium plating in a barrel, give it up. Plating chromium from a still solution will give you all you will have the desire to contend with. Also, if you use a brightener, such as cadmium or glue in your nickel solution, do not attempt to chromium plate over this. Brighteners make a nickel deposit brittle, and in attempting to deposit over such nickel deposits with chromium, the nickel peels off.

A brightener for nickel barrel solution would be: 4 oz. cadmium sulphate in 1 gallon of water, to be used in 2 fluid oz. portions as needed.

If the above does not fully answer your question, kindly be a little more descriptive and specific in your questions and we will be able to give you more complete information.

—Joseph Haas.

Pewter Plating Formula

Q.—Will you kindly let me have a formula for a solution which will put a pewter plate on brass? I would also like to have a formula for a dip to darken the pewter somewhat.

A.—To make up a pewter solution, use the following formula, dissolving in water in the order named:

Solution No. 1

Water .....1 gallon
Stannous chloride .....2 oz.
Rochelle salts .....1 oz.
Sodium hydroxide .....2½ oz.

Solution No. 2

Water .....1 gallon
Lead acetate .....½ oz.
Sodium hydroxide .....3 oz.

Mix the two solutions together and operate at a voltage of 1½ to 2. Use bars of ordinary solder as anodes.

To darken the deposit, brush over with the following solution, using a painter's sash brush:

Water .....1 gallon
Copper acetate .....1 oz.
Ammonium chloride .....½ oz.

Wipe off with a cloth thoroughly and then lacquer.

—Joseph Haas.

Softening Water for Plating

Q.—We are having a little trouble due to the condition of our water, which has thirty grains of hardness, consisting mostly of chloride lime. This condition spots our work after coming from the hot water which hardens up, and we very often cut the nickel through in order to get these spots off.

We are now trying a mild soap rinse before placing in hot water and this seems to help some. We would like to know if you could suggest something which would help us to eliminate this condition entirely.

In our nickel, in which we use the same water, we have a hard time to bring the pH down. It takes from 3 to 4 pounds of sulphuric acid per day in a 2,000 gallon tank to even bring this down to between 6.2 and 6.5. The nickel has 5 to 5½ ounces of metal to the gallon, and about 2½ ounces of chloride.

Our work is all stamped brass and cast brass, and we would like to know if adding this much sulphuric acid will cause us trouble in time, or whether the excessive hardness of the water will cause us trouble in our nickel tank.

A.—The only practical method of eliminating the hardness of water used in a plating room, is to soften it in the same manner in which water is softened for boilers. If you have your own boiler room you surely would not consider using the water such as you mention. Therefore you should not consider using it in your plating solutions.

Other concerns in the Middle West have found it to be a paying proposition to have the water softened before using it in the plating department, either as rinse water or for solutions. From your description you are having sufficient difficulty now with your nickel without waiting for the future to give you more.

—JOSEPH HAAS.

Statuary Bronze Finish

Q.—We are having some trouble getting a good statuary bronze finish on brass. We wonder if you could advise us on this subject?

A.—We presume you have in mind the finish called statuary bronze. You could use either of the following methods most convenient to you.

Method 1—Direct on Brass

Articles buffed and cleansed in usual plating manner are immersed in a warm solution of barium sulphide, ½ oz. water, 1 gallon, until a brown color is obtained. Scratch brush wet at 1,200 R. P. M., and then give the articles a quick dip in the barium sulphide solution. Rinse in cold water, dry in hot water (and warm sawdust if necessary), and lacquer.

Method 2

First copper plate articles and then immerse in a cold solution of

Water .....1 gallon
Potassium sulphuret .....¼ oz.

until a purple iridescent color is obtained. Rinse in cold water then in hot water, and dry scratch brush. Lacquer.

—JOSEPH HAAS.

Stripping Chromium from Die Castings

Q. Can you recommend any method of stripping chromium and nickel from die castings without injury to the base metal?

A.—Chromium is soluble in muriatic acid or dilute sulphuric. It dissolves in these acids quite rapidly, and if the articles are watched, the chromium can be removed without injury to the die castings.

To remove the nickel, make up an electrolytic strip of concentrated sulphuric acid. The die castings, of course, are placed into the strip as anodes. For cathode, use either lead or copper, preferably copper. Have a switch placed in the circuit so that it can be broken before removing articles. Use full voltage of the circuit, 6 to 12 volts. In this stripping operation also, if articles are watched the nickel can be removed and all that is necessary to prepare the die castings for plating is color-buffing. If after some use of the strip the zinc die castings show pitting, it is a sign that the strip has absorbed too much moisture from the air and a new strip should be made up

—JOSEPH HAAS.

Associations and Societies

American Electroplaters' Society

HEADQUARTERS, CARE OF GEORGE GEHLING, 5001 EDMUND STREET, PHILADELPHIA, PA.

Los Angeles Branch (Temporary)

HEADQUARTERS, CARE OF M. D. RYNKOFS, 1354 WEST 25TH STREET, LOS ANGELES, CALIFORNIA

Regular June Meeting

Twenty-four members were present at the regular meeting of the temporary Los Angeles Branch, American Electroplaters' Society, held June 12, 1929, at the Central Y. M. C. A., Los Angeles. The dinner, which usually precedes the meeting, was followed by a short business session, after which there was an instructive technical session under the direction of Charles Russell, librarian of the branch. The monthly Question Box contained the following questions:

How to Copper Plate Aluminum Without Preliminary Nickel Plating.
Methods of Gold Plating and Solution Maintenance.
Treatment of Cyanide Sores.
Anodes for Chromium Plating.
Control of Arsenic Content in Brass Solutions.
Method of Producing Statuary Bronze Finish Directly on Brass Without Preliminary Copper Plating.
Formula for Verde Green (Dark) Solution.

Each question was given consideration, most of them being discussed immediately and a few laid over until the next meeting, at which time some of the members will bring answers prepared in the interim.

At the next meeting the subject of chromium plating on aluminum will be discussed. The meeting will be held July 10, at 6:15 p. m., at Central Y. M. C. A., Los Angeles. Platers and others interested are urged to attend.

—M. D. RYNKOFS, Secretary.

Chicago Branch

HEADQUARTERS, CARE OF S. J. C. TRAPP, 1127 NORTH 7th STREET, MAYWOOD, ILLINOIS

New Officers Installed

The Chicago Branch, American Electroplaters' Society held its regular monthly meeting on June 8, 1929, at the Atlantic Hotel, Chicago. After concluding some business matters, including discussion of proposed changes in the constitution, F. J. Hanlon, past president of the Society, installed the officers recently elected for the 1929-30 year, as follows:

President, S. J. C. Trapp, formerly secretary-treasurer.
Vice-president, J. J. Witte.
Secretary-treasurer, J. C. Kretschmer.
Librarian, O. E. Servis.
Board of Managers: R. J. Hagucha, chairman; G. Jelineck, R. Kelly.
Sergeant-at-arms, David Greenblatt.

The meeting was then taken over by the librarian, O. E. Servis, who conducted the Question Box. After the session, the annual smoker took place. There was musical entertainment by the Apollo Quartet.

—J. C. KRETSCHNER, Secretary.

Personals

F. L. Driver, Jr., president of the Driver-Harris Company, Harrison, N. J., is in Europe on a business trip.

C. M. Loeb has resigned as president of the American Metal Company, New York. His successor has not been announced as yet.

Clarence A. Earl, former vice-president of the American Hardware Company, New Britain, Conn., is now president of the Charles Freshman Company, Chicago, Ill., radio manufacturers.

William F. Quinn has been appointed office manager of the Bausch Machine Tool Company, Springfield, Mass. Mr. Quinn was formerly with the James and E. H. Wilson Company, Pittsfield, Mass.

W. H. Kay has been appointed sales manager in the Kansas City district by the Surface Combustion Company, Toledo, Ohio. In former years Mr. Kay has been in company's erection, estimating and sales departments.

J. P. Armstrong has been appointed manager of the metal stampings contract division in California for the Geuder, Paeschke and Frey Company, Milwaukee, Wis. He will make his headquarters in the Balboa Building, San Francisco.

A. D. Camp has joined the carbon sales division of the National Carbon Company. Mr. Camp has been technically engaged in the carbon field for many years. For the past three years he has been on the staff of the Aluminum Company of America, Pittsburgh, Pa.

Frederick M. Becket, vice-president of the Electro Metallurgical Company and the Union Carbide Company, both of New York City, sailed on June 14 for Italy. Mr. Becket, with his family, intends to tour a number of countries in Europe, returning in the fall.

J. F. Hahn has been appointed vice-president and treasurer in charge of finance of the National Enameling and Stamping Company, Inc., Milwaukee, Wis. **Thomas Gulley** has been named vice-president in charge of sales. Both have been with the company for many years.

Julian D. Conover has been appointed secretary of the American Zinc Institute, New York City, to succeed **Stephen S. Tuthill,** whose resignation becomes effective August 1. Mr. Conover was formerly for seven years secretary of the Tri-State Zinc and Lead Ore Producers' Association.

L. H. Beyer has become sales director of the Durbar bearing bronze division of the Buffalo Bronze Die Cast Corporation, Buffalo, N. Y. Formerly, Mr. Beyer was for many years identified with the American Radiator Company, same city, as manufacturing executive and as director of purchases.

Merton W. Zeman, sales manager of the machine division of the Osborn Manufacturing Company, Cleveland, Ohio, has returned from Europe. He was accompanied by **William Rawlinson,** managing director of J. W. Jackman and Company, London, England, who is making an inspection tour of American plants.

George E. Irvin, foreman plater, Reading Hardware Company, Reading, Pa., and Mrs. Irvin, in returning from a four months' vacation in California, Colorado, Arizona and Utah, stopped over at the annual convention of the American Electroplaters' Society, held in Detroit July 8 to 11. Mr. Irvin has resumed his duties with the Reading Hardware Company.

Willard A. Johnson has been made manager of the eastern offices of the National Acme Company, Cleveland, Ohio, to succeed **Harry T. Latto,** resigned June 16, 1929. Mr. Johnson has been with the company for some time, being previously connected with the Ohio offices, going from there to the New York district, headquarters of which are at 117 Liberty Street, New York City.

Thomas Evans, vice-president of Merchant and Evans Company, Philadelphia, Pa.; **Charles Hook,** vice-president of American Rolling Mill Company, Middletown, Ohio; and **Charles Piez,** chairman of Link-Belt Company, Chicago, Ill., have been appointed to a committee which will study immigration problems for the Chamber of Commerce of the United States, Washington, D. C.

George F. Bain has been appointed northeastern district manager for the Copperweld Steel Company, Glassport, Pa. His territory includes New England and New York north of Westchester and Rockland counties. **Paul Van Wagner** continues as district manager for New York, New Jersey, Pennsylvania and West Virginia. Both maintain headquarters at 30 Church Street, New York City.

F. C. Frary, director of research of the Aluminum Company of America, Pittsburgh, Pa., was elected president of the American Electrochemical Society at the annual meeting in Toronto, Canada, May 29. Dr. Frary has been with the Aluminum Company since 1919, having previously been with the Chemical Warfare Division, U. S. A. Among his achievements have been the invention of "Frary" metal (in collaboration with Dr. S. Temple), and the development, with Major D. J. Demorest, of the world's largest phosgene plants. Dr. Frary graduated from the University of Minnesota in 1905 and spent ten years teaching there.

The Hanson-Van Winkle-Munning Company of Matawan, New Jersey, manufacturers of electroplating and polishing equipment and supplies, has recently made a number of changes in its sales organization. **H. R. Smallman,** for the past three years assistant to the sales manager, has been made manager of the Chicago office, with headquarters at 549 West Washington Boulevard. **H. M. Cherry,** who for the past seven years has represented the company in Michigan, has been made manager of the Detroit office, with headquarters at 5415—12th Street. **Louis M. Hague,** who for the past two years has represented the company in Western Pennsylvania, has been made manager of the Pittsburgh-Cleveland office, with headquarters at 106 Liberty Avenue, Pittsburgh, Pa., the territory comprising Ohio, Western Pennsylvania and West Virginia.

C. J. Steuber, Milwaukee district sales manager for the Carborundum Company, Niagara Falls, N. Y., has been appointed district sales manager at Detroit, with headquarters in the new Carborundum Building, 2759 East Grand Boulevard, Detroit. He succeeds **Anthony Dobson,** who is retiring from active business. **H. E. Kerwin,** formerly of the Chicago district, takes over Mr. Steuber's place at Milwaukee, while **Robert Rainnie** will succeed Mr. Kerwin in the Chicago territory. **George Harden,** formerly of the Flint, Saginaw and Bay City, Mich., territory, has been made sales manager for Germany, with headquarters at the Deutsche Carborundum Works, Dusseldorf, Germany. He will be succeeded in the Michigan areas he covered by **J. C. Gallen,** formerly occupied with the Lansing and Ann Arbor districts in Michigan. **H. S. Monroe,** formerly of the Detroit area, succeeds Mr. Gallen and is succeeded in his old territory by **Philip R. Dumas.**

Business Reports in Brief

Wisconsin Metal Products Company, Racine, Wis., has plans for a one-story addition, 56x136 ft.

Barnett Iron and Metal Company, Barberton, Ohio, has changed its name to I. A. Barnett Company.

Davidson Enamel Products, Inc., Lima, Ohio, has started operations in a branch plant at Connersville.

Zouri Drawn Metals Company, Chicago Heights, Ill., has plans for an extension to cost about $30,000.

Bay State Abrasive Products Company, Westboro, Mass., has plans for additional manufacturing units.

Canadian Ohio Brass Company, Niagara Falls, Ont., Canada, is in the market for equipment for the manufacture of brass.

Old Colony Plating Company, 135 Old Colony Avenue, So. Boston, Mass., plans additions and alterations to its plant. Private plans.

Pyle National Company, Chicago, Ill., manufacturer of electric head lights, will build a two-story addition, 91 by 110 ft. to cost $48,000.

Magnetic Mfg. Company, Milwaukee, Wis., is planning an addition to cost $30,000 with equipment. Machine tools will be purchased.

C. and G. Foundry Company, Indianapolis, Ind., has taken over **United Brass Works,** to enlarge its facilities. Charles J. Geisler is president.

Kasle Iron and Metal Company, Toledo, Ohio, has awarded general contract for a one-story plant, to cost about $40,000 with equipment.

Model Brass Foundry, Decatur, Ill., is erecting an addition to its plant, including a machine shop, 24x40 ft., which will double former capacity.

Leonard and Rooke Company, 486 Broad Street, Providence, R. I., manufacturer of valves, has plans for a three-story and basement addition, 60x100 ft.

Strayer Coin Bag Manufacturing Company, New Brighton, Pa., has awarded general contract for a one-story addition, to cost over $30,000 with equipment.

Howard Brass Foundry, 2701 Fulton Street, Chicago, Ill., has moved to Franklin Park, Ill. The name of the company has been changed to Howard Foundries, Inc.

Vortex Wing Corporation, Glendale, Cal., manufacturer of aircraft specialties, has plans for a one-story unit, 66 x 85 ft., to cost about $25,000 with equipment.

J. T. Healy and Son, 196 Main Street, Attleboro, Mass., jewelry manufacturers, are erecting a one-story manufacturing plant, 26x96 ft. Buffing tools are under consideration.

Philadelphia Insulated Wire Company, 200 North Third Street, Philadelphia, Pa., has taken over adjoining building, totalling about 7,500 sq. ft. floor space, for expansion.

Runzel Lenz Electric Manufacturing Company, 1751 North Western Avenue, Chicago, Ill., plans to rebuild a factory recently destroyed by fire. Estimated cost $150,000.

United States Phosphoric Products Company, East Tampa, Fla., J. E. McKee, general manager, will build a one-story, 130 x 160 ft. galvanized iron treating plant. Estimated cost $300,000.

John A. Roebling's Sons Company, Trenton, N. J., manufacturer of wire rope, cables, etc., has awarded general contract for a one-story addition, to cost about $125,000 with equipment.

Extruded Metal Products Company, 109 S. Lincoln Avenue, Wheeling, W. Va., has begun work on a one-story foundry, to cost about $25,000 with equipment. Joseph Millard is president.

Eastman Manufacturing Company, Manitowoc, Wis., manufacturer of hose couplings and other metal specialties, is deferring construction of an addition until fall or early next year.

Wilkening Manufacturing Company, Philadelphia, Pa., manufacturer of piston rings, radio equipment, etc., has awarded general contract for a one-story addition, to cost about $25,000.

Worcester Brass and Electroplating Company, 316 Shrewsbury Street, Worcester, Mass., lost by fire all enameling ovens and accessories. The company plans to install new equipment soon.

B. Mercil and Sons Plating Company, 1911 Fulton Street, Chicago, Ill., manufacturer of plated metal goods, has let contract for a one-story addition, to cost about $45,000 with equipment.

C. H. Hanson Company, 178 North Clark Street, Chicago, Ill., awarded contract for the addition to factory for the manufacture of brass baggage checks, plates, etc. Estimated cost $50,000.

Mueller Company, Decatur, Ill., manufacturer of brass pipe, plumbing equipment, etc., is having plans prepared for a two-story factory branch at Atlanta, Ga., to cost about $90,000 with equipment.

Luna Metal Craft Corporation, sheet metal specialties, stampings, etc., formerly located on W. 21st Street, New York, has moved to 38-40 Emerson Place, Brooklyn, N. Y. **H. A. Nodler** is president.

Standard Stamping and Perforating Company, Chicago, Ill., manufacturers of perforated metals, sheets, screens, etc., plans the construction of a one-story, 90 x 143 ft. factory. Estimated cost $20,000.

Eagle Bronze Works, Inc., 10 North Bleeker Street, Mount Vernon, N. Y., has awarded general contract for a four-story addition, and improvements in present plant, to cost about $45,000, including equipment.

Gilby Wire Company, 150 Riverside Avenue, Newark, N. J., manufacturer of wire and tubing for radio trade, has placed contract for two one-story factory buildings, 50x160 ft. and 20x50 ft., to cost $100,000.

Gillender and Company, Philadelphia, Pa., brass manufacturers, was completely demolished by a four-alarm fire recently. The structure, covering several acres, is located on State Road, near Robbins Avenue.

General Fountain and Fixture Company, Chicago, Ill., manufacturer of soda fountain equipment, store fixtures, etc., has leased space in building at 921 W. 19th Street, totalling about 60,000 sq. ft. floor space, for a new plant.

Haco Steel Corporation, Hanover, Pa., recently formed by Harry N. Gitt and Max Meth, and associates, will operate a local plant for the manufacture of metal alloy and steel products. The company is capitalized at $100,000.

Extruded Metal Products Company, 106 South Lincoln Avenue, Wheeling, W. Va., has begun work on its new foundry. The building is a one-story structure, which together with equipment, will cost $25,000. Joseph Millard is president.

Vulcan Stamping and Manufacturing Company, 4036 West Lake Street, Chicago, Ill., has completed two new buildings and has expanded its line of work to including welding, specializing in electric seam and spot welding of gasoline tanks.

Rainbow Light, Inc., 3166 Washington Street, Boston, Mass., manufacturer of electric signs and displays,

will expand local plant, particularly the line of luminous tube units. Miles Pennybacker is manager in charge of the New England operations.

The C. F. Witters Foundry and Supply Company, 488 Virginia Street, Milwaukee, Wis., are now representing **E. Reed Burns and Sons., Inc.,** 1811-13 Carroll Avenue, Chicago, Ill., carrying a stock in Milwaukee of the ERBCO line of polishing and buffing compositions.

Wichita Brass and Aluminum Foundry Company, Wichita, Kans., has been absorbed by the Air Industries Foundry Company, Wichita. The brass company has moved from its location at 912 North Washington Street to a new plant at 701-09 East Ninth Street, Wichita.

Lionite Abrasive Company, a subsidiary of General Abrasive Company, Niagara Falls, N. Y., has acquired an 8-acre tract at Niagara Falls, Ont., and plans construction of a new plant to cost over $100,000 with equipment. Allen V. Parker is president of the Lionite organization.

Reynolds Metals Company, Louisville, Ky., is having plans prepared for a two-story, 90x100 ft., factory for the manufacture of tin, lead and aluminum foil, on Hale Avenue. Estimated cost $60,000. They are also planning for a one-story, 140x216 ft., factory for the manufacture of aluminum powder.

Sidney Brass Works Company, Sidney, Ohio, manufacturer of brass, bronze and aluminum castings has taken over the Wapak Holloware Company, Wapakoneta, manufacturer of gas cooking utensils. Operation of that plant was begun recently. George Trautman is president and general manager.

Titan Electric Company, Butler, Ind., manufacturer of motors, generating apparatus and other electrical equipment, has purchased property at Adrian, Mich., heretofore held by Adrian Improvement Company. The plant will be removed from Butler to the new location, and additional equipment installed.

American Electro Metal Corporation, Lewiston, Me., has authorized an addition to its plant, work to begin soon. In the fall, the company will develop increased production and will construct additional buildings at that time, including a foundry. The entire project will cost more than $150,000.

Napoleon Stamping Company, Napoleon, Ohio, manufacturer of metal stampings has sold plant and property to C. O. Miniger, president, Electric Auto Lite Company, Toledo, Ohio, and C. S. McIntyre, president, Monroe Auto Equipment Company, Monroe, Mich. The plant will be continued in service, and expansion carried out.

Empire Brass Manufacturing Company, London, Ont., Can., has purchased the plumbing supply business of the Canada Metal Company, Toronto, and has also taken over the sales staff of that department. The remainder of the business of the Canada Metal Company will continue under its old management without change of personnel or policy.

Wagner Electric Corporation, St. Louis, Mo., has moved its Buffalo service station and branch sales office to a new building at 1796 Main Street. The Buffalo office handles the entire Wagner line of motors, transformers, fans and Lockhead hydraulic brakes, not only as a branch sales office, but also as a repair shop and service station.

The Photogenic Company, Youngstown, Ohio, manufacturers of photographic arc lamps, plan expansion, including the addition of a new small parts brass foundry. The company has purchased a $25,000 plant at 21 Olive Street, Youngstown, and will erect the foundry next to it. Brass will be cast for the company's needs and also for other concerns.

Century Electric Company, 1806 Pine Street, St. Louis, Mo., has acquired plant and business of Roth Brothers and Company, 1400 W. Adams Street, Chicago, manufacturer of dynamos, power motors and other electrical equipment, and will consolidate. It is proposed to continue Chicago plant as a branch factory, with transfer of certain products for production at St. Louis.

General Bronze Company, Pittsburgh, Pa., has purchased Flour City Ornamental Iron Company, Minneapolis, Minn., and will consolidate. It is proposed to continue plant at present location, and carry out an expansion program. The company has arranged for the purchase also of Dominion Bronze and Iron Company, Ltd., Winnipeg, Man., and will continue operations as a Canadian subsidiary.

Acosta Aircraft Corporation, Trenton, N. J., operating at recently established plant on Whitehead Road, formerly used by **Mercer Automobile Company,** will establish a department for production of metal speed motor-boats, in addition to regular airplane manufacture. Boats will average about 12 ft. long with beam measurement of 4 ft. and V-type step bottom, designed to use any type of outboard motor. **George H. Stewart** is general manager.

M and M Development Company, Monroe, Mich,, plans to organize for the purpose of merging into one organization several companies engaged in metal stamping and forging operations. The company will be headed by **C. O. Miniger,** president of the **Toledo Auto Lite Company,** and a director of the **Monroe Auto Equipment Company,** and **President McIntyre,** of the Monroe Auto Lite Company. They will be, respectively, president and vice-president. The company plans to take over about 1,000 acres of land, which has been purchased or is under option, and locate a group of plants on industrial sites included in the purchase, while placing some of the land on the market for residential purposes. Authorized capital stock will be $600,000 in no-par shares. Both Monroe and Toledo capital is to be interested in the venture.

New Companies

Harris Winnick, jewelry, M. Winkler, 140 Broadway, New York; $10,000.

Lincoln Jewelry Manufacturing Company, D. H. Hausman, 17 John Street, New York; $20,000.

Gulf Brass Works, Inc., Tampa, Fla., machine shops, construction business, 60 shares no par value; C. F. Thompson, A. G. Turner, John Bell, board of directors.

Easton Chromium Plating Company, Inc., 685 Northampton Street, Easton, Pa., has been organized to do chromium, cadmium, copper, nickel, silver and brass plating and polishing. The company is equipped to do this work on production basis.

The **Raphael Jewelry Manufacturing Company, Inc.,** New Haven, Conn. Paid in $2,000 in cash and $1,800 in property. President and treasurer, Dan H. Raphael;

vice-president and assistant treasurer, Fannie A. Raphael; secretary, Bernard Raphael.

F. H. Hopkins and Company, Ltd., Montreal, Canada, has been incorporated to carry on the business as iron founder, steelmaker and brass founder, with a capital stock of 2,500 shares of no par value, by R. C. Holden, P. P. Hutchinson, E. H. Cliff and others, all of Montreal.

New York Art Iron Works Corporation, 653 First Avenue, New York, has been incorporated, succeeding to business of Oscar Luetke. New company will continue the manufacture of ornamental hand-wrought iron and bronze. J. Sesek is president and John Leopold, vice-president.

The **Service Jewelry Manufacturing Company,** Indianapolis, Ind., capital stock, 1,000 shares no par value; objects, buying and selling precious, semi-precious and imitation stones, engraving and designing; incorporators, Clarence F. Roembke, Leo A. Wachstell, Frank B. Grubb.

Anderson Brass Foundry and Machinery Company, Inc., Bridgeport, Conn.; incorporators, Thomas W. Anderson, Samuel N. Silverstone and Attorney David Goldstein. The company is capitalized for $50,000 divided into 500 shares of common stock at $100 par value. A total of $2,000 has been paid in.

J. E. Horton, 146 North Eleventh Street, Reading, Pa., and associates have organized the **Empire Steel Castings Company,** and plan operation of a foundry at Frush Valley, Berks County, to manufacture iron, steel and metallic alloy castings. W. E. Belcher, 313 S. Broad Street, Philadelphia, is interested in the new company.

Production Foundry Company, 2700 Magnolia Street, Oakland, Calif., has been established for the manufacture of aluminum castings. Property has been purchased which has a total area of 14,500 sq. ft. The foundry department occupies 4,730 sq. ft. The value of buildings and equipment is approximately $17,000. Leon Cameto is the owner and general manager.

Walbert Manufacturing Company, Chicago, Ill., has been organized with capital of $1,500,000 to manufacture radio equipment and parts. The company will take over the firm of the same name, with local plant at 1000 Fullerton Avenue, specializing in radio equipment, and **Story and Clark Piano Company,** Chicago, and Grand Haven, Mich. The new company will concentrate production largely at last noted place; Chicago works of former Walbert company will be moved to Grand Haven, occupying a unit of Story and Clark company, with installation of additional equipment for output of 1000 complete radio sets daily. Consolidation will also include **Club Aluminum Utensil Company,** Chicago and New York.

Trade Publications

The Chips Tell a Story. E. F. Houghton and Company, Philadelphia, Pa. Leaflet on cutting oils.

Looseleaf Catalog of Plating and Polishing Equipment and Supplies. Lasalco, Inc., Lasalle Street, St. Louis, Mo.

Uehling Barometer and Vacuum Recorder for Steam Turbines. Uehling Instrument Company, Paterson, N. J.

What It Takes to Make Laclede-Christy Fire Brick. Laclede-Christy, 1711 Ambassador Building, St. Louis, Mo. Illustrated leaflet.

Welded Chain. American Chain Company, Bridgeport, Conn. Leaflet on use and abuse of this type of chain; also contains tables on safe working loads, etc.

Allen Air Appliance Company, 452 Lexington Avenue, New York City. Bulletin A-50, covering compressors, exhausters, vacuum cleaning equipment, etc.

Round Form Recorders. C. J. Tagliabue Manufacturing Company, Brooklyn, N. Y. Broadside on precision indicating, recording and controlling instruments.

C-E Water Level Indicator. Combustion Engineering Corporation, 200 Madison Avenue, New York City. Illustrated folder on a new product of this company.

Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa., publications: Type NAB Nofuz Panelboards; Power at the Touch of a Button (line-starters).

Certified Selling. A. C. Nielsen Company, Chicago, Ill. No. 7 of the company's monthly magazine. One dollar a year to all except subscribers to the company's surveys.

Standard Arch Industrial and Boiler Furnace Construction. Standard Arch Company, Frostburg, Maryland. Booklet on a new construction method. The company is affiliated with the Big Savage Fire Brick Company.

Rolled Zinc. The New Jersey Zinc Company, 160 Front Street, New York City. Complete technical and descriptive data on all rolled forms of this metal, in illustrated booklet punched to fit standard size notebooks.

A Study of Dirt. Cowles Detergent Company, Cleveland, Ohio. Contained in Cowles Comments, company publication, this series of three articles comprises a discussion of the scientific side of metal cleaning. Free on request to the company.

Thermo-Elements. Charles Engelhard, Inc., 30 Church Street, New York. Platinum and platinum-rhodium elements, rare metal and base metal types, are discussed, with regard to the reclamation of elements in the replacement of thermo-couples.

General Electric Company, Schenectady, N. Y., publications: Motor Drive for Metal Working Machinery (32 pages, illustrated); G-E Arc Welding School (8 pages, illustrated); Industrial Heating Devices; Type WD-300A Arc Welder; Type WD-200A Arc Welder; Induction Motor-Generator Sets.

Metal Finishing Information. The Egyptian Lacquer Manufacturing Company, New York City. Four new cards for inclusion with the binder issued by this company some time ago. The new cards give the following finishes: Jet Black Electro Deposit; Brown on Copper; Imitation Fire Gilt Finish; English Bronze. The cards are available gratis upon request to the company at 90 West Street, New York City, or its various branches.

Metal Prices, July 22, 1929

NEW METALS

Copper: Lake, 18.125. Electrolytic, 18.00. Casting, 17.375.
Zinc: Prime Western, 6.80. Brass Special, 6.90.
Tin: Straits, 47.375. Pig, 99%, 46.875.
Lead: 6.55. **Aluminum,** 24.30. **Antimony,** 8.75.
Nickel: Ingot, 35. Shot, 36. Elec. 35. Pellets, 40.
Quicksilver: flask, 75 lbs., $122. **Bismuth,** $1.70.
Cadmium, 95. **Cobalt,** 97%, $2.60. **Silver,** oz., Troy, 52.625.
Gold: oz., Troy, $20.67. **Platinum,** oz., Troy, $64.00.

INGOT METALS AND ALLOYS

Brass Ingots, Yellow	12¾to14
Brass Ingots, Red	15¾to16¾
Bronze Ingots	17¼to18
Casting Aluminum Alloys	21 to24
Manganese Bronze Castings	27 to39
Manganese Bronze Ingots	15 to20
Manganese Bronze Forgings	35 to43
Manganese Copper, 30%	30 to40
Monel Metal Shot	28
Monel Metal Blocks	28
Parsons Manganese Bronze Ingots	16½to19¾
Phosphor Bronze	19 to22
Phosphor Copper, guaranteed 15%	22¼to25
Phosphor Copper, guaranteed 10%	20¼to24
Phosphor Tin, no guarantee	55 to70
Silicon Copper, 10%.....according to quantity	28 to35

OLD METALS

Buying Prices		Selling Prices
16½to16¾	Heavy Cut Copper	17½to17¾
14½to14¾	Copper Wire, mixed	15½to15¾
11¾to12	Light Copper	12¾to13
13 to13¼	Heavy Machine Composition	14 to14¼
9 to 9½	Heavy Brass	10 to10½
7 to 7½	Light Brass	8 to 8½
9¾to10¼	No. 1 Yellow Brass Turnings	10¾to11¼
12¼to12½	No. 1 Composition Turnings	13¼to13½
5⅛to 5⅜	Heavy Lead	5⅞to 6⅜
3¼to 4¼	Zinc Scrap	4¼to 5¼
8 to10	Scrap Aluminum Turnings	12½to14¼
13 to13½	Scrap Aluminum, cast alloyed	17½to18½
19 to20	Scrap Aluminum sheet (new)	22 to22½
30½to32	No. 1 Pewter	35 to38
20 to21	Old Nickel Anodes	22 to23
20 to23	Old Nickel	22 to25

Wrought Metals and Alloys

COPPER SHEET

Mill shipment (hot rolled) .....27¾ to 28¾c. net base
From Stock .....28¾ to 29¾c. net base

BARE COPPER WIRE

19⅝c. to 19⅞c. net base, in carload lots.

COPPER SEAMLESS TUBING

29¼c. to 30¼c. .net base.

SOLDERING COPPERS

300 lbs. and over in one order .....26¼c. net base
100 lbs. to 200 lbs. in one order .....26¾c. net base

ZINC SHEET

Duty sheet, 2c. per lb. Cents per lb.
Carload lots, standard sizes and gauges, at mill, less 7 per cent discount .....10.25 net base
Casks, jobbers' price .....10.50 net base
Open casks, jobbers' price .....11.00-11.50 net base

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base, ton lots, per lb. 33.30
Aluminum coils, 24 ga., base, price 31.00

ROLLED NICKEL SHEET AND ROD

Net Base Prices

Cold Drawn Rods	53c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

BLOCK TIN SHEET

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more 10½c. over Pig Tin; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 17c. over; less than 25 lbs., 25c. over.

SILVER SHEET

Rolled sterling silver 54.625 to 56.625c per ounce, Troy.

BRASS MATERIAL—MILL SHIPMENTS

In effect April 16, 1929.
To customers who buy 5,000 lbs. or more in one order.

	Net base per lb. High Brass	Low Brass	Bronze
Sheet	$0.23¼	$0.25	$0.26¼
Wire	.23¾	.25½	.26¾
Rod	.21¼	.25¾	.27
Brazed tubing	.30⅞	....	.35⅞
Open seam tubing	.31¼	....	.34¼
Angles and channels	.31¼	....	.34¼

BRASS SEAMLESS TUBING

28¼c. to 29¼c. net base.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod ..... .25¾c. net base
Muntz or Yellow Metal Sheathing (14"x48")... .24c. net base
Muntz or Yellow Rectangular sheet other Sheathing ..... .25c. net base
Muntz or Yellow Metal Rod ..... .22¼c. net base
Above are for 100 lbs. or more in one order.

NICKEL SILVER (NICKELENE)

Net Base Prices

Grade "A" Sheet Metal		Wire and Rod	
10% Quality	31⅜c.	10% Quality	34⅛c.
15% Quality	33c.	15% Quality	37¾c.
18% Quality	34¼c.	18% Quality	41c.

MONEL METAL SHEET AND ROD

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less, No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin. price; 100 lbs. to 500 lbs., 10c. over; 50 to 100 lbs., 15c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices f. o. b. mill.

Supply Prices, July 22, 1929

ANODES

Copper: Cast	28c.	per lb.
Rolled, oval	27c.	per lb.
Rolled, sheets, trimmed	27¾c.	per lb.
Brass: Cast	27c.	per lb.
Zinc: Cast	12½c.	per lb.

Nickel: 90-92%	45c. per lb.
95-97%	47c. per lb.
99%	49c. per lb.

Silver: Rolled silver anodes .999 fine are quoted from 55½ to 57½, Troy ounce, depending upon quantity.

FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 100 lbs.	100 to 200 lbs.	Over 200 lbs.
10-12-14 & 16"	1" to 3"	$3.00/lb.	$2.75/lb.	$2.65/lb.
6-8 & over 16	1 to 3	3.10	2.85	2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 up to 6	¼ to 3	4.85	4.85	4.85
4 up to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

Grey Mexican Wheel deduct 10c per lb. from White Spanish prices

COTTON BUFFS

Full Disc Open buffs, per 100 sections.

12" 20 ply 64/68 Unbleached	$27.06to$29.00
14" 20 ply 64/68 Unbleached	35.59to 37.65
12" 20 ply 80/92 Unbleached	30.70to 34.16
14" 20 ply 80/92 Unbleached	41.60to 46.09
12" 20 ply 84/92 Unbleached	39.31to 42.90
14" 20 ply 84/92 Unbleached	57.60
12" 20 ply 80/84 Unbleached	38.35to 39.37
14" 20 ply 80/84 Unbleached	52.00to 53.12
Sewed Pieced Buffs, per lb., bleached	40c. to 73c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.14-.19
Acid—Boric (Boracic) Crystals	lb.	.08½
Chromic 100 and 400 lb. drums	lb.	.19½
Hydrochloric (Muriatic) Tech., 20°, Carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30% bbls.	lb.	.08
Nitric, 36 deg., carboys	lb.	.06
Nitric, 42 deg., carboys	lb.	.07
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	.16¾-.21¼
Denatured, drums	gal.	.45-.57
Alum—Lump, Barrels	lb.	.03¼
Powdered, Barrels	lb.	.039
Aluminum sulphate, commercial tech	lb.	3.3
Aluminum chloride solution in carboys	lb.	.06½
Ammonium—Sulphate, tech., bbls.	lb.	3.3
Sulphocyanide	lb.	.65
Arsenic, white, kegs	lb.	.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.60
Borax Crystals (Sodium Biborate), bbls	lb.	.04½
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.06
Chrome Green, bbls.	lb.	.25
Chromic Sulphate	lb.	.30
Copper—Acetate (Verdigris)	lb.	.23
Carbonate, bbls.	lb.	.21½
Cyanide (100 lb. kegs)	lb.	.50
Sulphate, bbls.	lb.	6.7
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$70.00
Fusel Oil	gal.	$4.45
Gold Chloride	oz.	$12.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.59-.61
Iron Sulphate (Copperas), bbl.	lb.	.01½
Lead Acetate (Sugar of Lead)	lb.	.13¼
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Nickel—Carbonate, dry, bbls.	lb.	.35
Chloride, bbls.	lb.	.20
Salts, single, 300 lb. bbls.	lb.	.13
Salts, double, 425 lb. bbls.	lb.	.13
Paraffin	lb.	.05-.06
Phosphorus——Duty free, according to quantity	lb.	.35-.40
Potash, Caustic Electrolytic 88-92% broken, drums	lb.	.09
Potassium Bichromate, casks (crystals)	lb.	.09¼
Carbonate, 96-98%	lb.	.06¾-.07
Cyanide, 165 lb. cases, 94-96%	lb.	.57½
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.05½
Silver Chloride, dry, 100 oz. lots	oz.	.42
Cyanide (fluctuating)	oz.	.52
Nitrate, 100 ounce lots	oz.	.36¼
Soda Ash, 58%, bbls.	lb.	.02½
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.18
Hyposulphite, kegs	lb.	.04
Nitrate, tech., bbls.	lb.	.04¾
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.02
Sulpho Cyanide	lb.	.32½
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.35½
Tripoli, Powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc Carbonate, bbls.	lb.	.11
Chloride, casks	lb.	.06¾
Cyanide (100 lb. kegs)	lb.	.41
Sulphate, bbls.	lb.	.03¾